plating

JOURNAL OF THE AMERICAN ELECTROPLATERS' SOCIETY

JANUARY
1957

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For WAVY

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164-Z for zinc-base die castings

202 SPECIAL recently developed purposely . . .

. . . to produce high luster on brass parts; also suitable for all other metals except zinc or lead base castings.

can cause such stains.

We suggest that if you are doing any barrel burnishing, you ask our Field Service Man to check your production methods and materials. Backed by many years of experience in this very line of work, perhaps he can be of help.

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PAGES

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"ENSTRIPS" – invented and patented by Enthone, Incorporated – are chemical products for dissolving one metal from another, quickly . . . economically . . . without attacking the base. Available for nickel, copper, chromium, zinc, cadmium and silver. For the *right* stripper for *your* needs, write to Enthone, outlining your requirements. Ask for the Enthone "Enstrips" Booklet.

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Metal Finishing Processes • Electroplating Chemicals

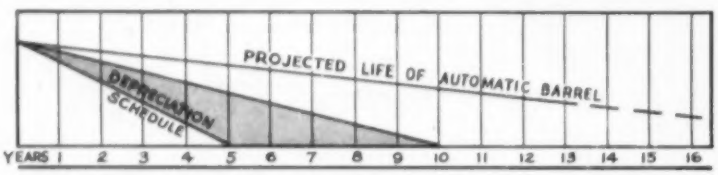
A HOT IDEA FOR COOL PROFITS

THE FINISHING TOUCH

by A. B. HOEFER
Vice-President
FREDERIC B. STEVENS, INC.

Stevens Automatic Plating Barrels Adaptable to Any Situation

IT'S GOOD TO KNOW WHEN YOU ARE INVESTING in a plating machine that Stevens units can be designed so that more than one type of plating can be done on one machine. Also, that changes can be made in the future to meet any specifications you may have. We've changed over a good number of Stevens machines in our time. That's why there are so many Stevens machines in use far beyond their depreciation schedule.



THERE ARE MANY OTHER SAVINGS you can enjoy beyond long life. Stevens Automatic Barrel machines require only one employee to operate the machine. These units are completely automatic, because the open end barrel is loaded when in a vertical mouth-upward position and automatically unloaded by tilting the barrel downward. There are no lids to fasten or unfasten.

POSSIBLE MIXING OF PARTS IS ELIMINATED in the Stevens automatic barrel. Small, special loads can be conveniently run without penalizing the productive capacity of the machine and without the inconvenience of partitioned cylinders. Stevens Automatic Barrel Machines are used for varied processes that include copper strike; copper, nickel, tin, brass, zinc and cadmium plating; phosphating; alrocing; dichromating; cleaning and bright dipping.

THE SIMPLE COMPACT DESIGN of this machine permits production capacities as high as 4,000 pounds per hour. Simplicity of design makes it equally practical to distribute the capacity between two or more machines to provide flexibility in plating thicknesses and production.

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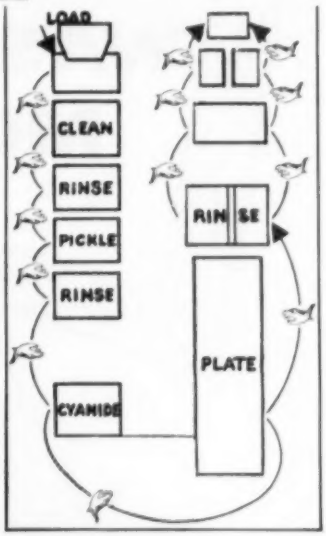
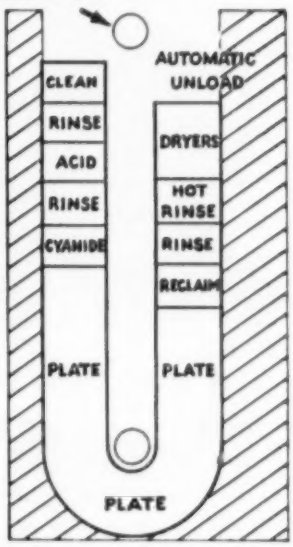
HOW AUTOMATIC BARREL PLATING CAN REDUCE YOUR HANDLING AND BURDEN COSTS—

Compare this
Conventional Horizontal Barrel Line



With this
Stevens Automatic Barrel Installation



Production from *both* installations is the same.

Notice how many more handling steps (indicated by the illustrated hands) and manual load-unload operations (indicated by the arrows) are required for the manual set-up.

Notice, too, how much floor space (indicated by shaded area) is saved with a Stevens automatic installation. No manual operations required with automatic load and unload.

An Educational Society for the Advancement of the Science of Electroplating, the Finishing of Metals and Allied Arts

plating

Journal of the American Electroplaters' Society

January 1957 **Vol. 44, No. 1**

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SOCIETY of BUSINESS MAGAZINE EDITORS

Editorial:
Time Table in the Courtship of Knowledge 7

Mechanical Finishing of Precision Parts *by L. H. Hopewell* 36

Barrel Finishing with Steel Balls and Shapes *by C. B. Schaefer and R. G. Messenger* 40

Preparation for Electroplating with Abrasive Belts *by Warren K. Seward* 43

The Role of Modern Barrel Finishing—*Interview with C. B. Glasrud* 47

Stop Chrome Waste, Pollution and Heat Loss *by E. W. Neben* 52

AES Branch Directory	64	Future Meetings	112
AES Directory	112	Industry News	20
AES Membership Report	78	Industry News Briefs	22
AES News	74	Index to Advertisers	113
Article References	72	Intersociety News	80
Branch News	88	Mail Box	78
Classified Advertisements	112	Patent Abstracts	68
Equipment and Supplies	56	Personals	28

More complete corrosion of anodes by using the HARSHAW ANOCAP

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EDITORIAL

Time Table in the Courtship of Knowledge

TECHNICAL and scientific advances in the field of electroplating, metal finishing and allied arts are being made from day-to-day, month-to-month and year-to-year. The reporting of them so as constantly to broaden the knowledge of its members is a function of the American Electroplaters' Society and a principal mission of its PLATING magazine.

As PLATING enters its 44th volume, the 1957 tentative schedule to that end looms rewarding for its readers.

For instance, this January issue ushering in 1957, concentrates upon abrasives and mechanical finishing. It is the second annual edition on this subject and results from the wide interest evoked by last year's trailblazer.

One of the expected features for the February issue will be the paper tentatively titled "Anodized Aluminum for Automobile Trim Parts." Created by Cleveland F. Nixon, Head of the Electro-Chemistry Department, Research Staff, General Motors Corporation, it appears to be widely anticipated technical fare for PLATING readership.

March will bring the Society's first Organic Coating issue, and an array of technical papers and sidelights on that subject are in process of production as a result of broad effort by experts.

Target of that issue will be worthwhile data on phases of organic finishing in which platers are concerned, possibly including: 1) Organic stop-off lacquers and masking materials, 2) Protective lacquers over plated surfaces, 3) Processes for preparing metals for painting: i.e., phosphating and chromating of steel, zinc plate, aluminum and magnesium, 4) Stripping of organic coatings, 5) Rack coatings, 6) Maintenance painting, 7) Protective coatings over plated or phosphated surfaces.

Tentatively, the May issue will be a Research Committee issue through which the Society's technical research program being conducted at various American universities and foundations here and in Canada will be treated by experts of the Research Committee itself.

That issue will, in turn, be followed by the popular Convention number in June.

Knowledge being power, the power of any field of endeavor largely stems from up-to-date marshaling, documentation, factual communication and broad application of its technical and scientific knowledge.

PLATING's goal is to continue to well-serve its readers as a vehicle of conveyance of cumulative and accumulating knowledge on electroplating, mechanical finishing and allied arts. You as a scientist, technician or practical plater can assist by preparing the papers embodying such current, authoritative educational data. Write us for details about how you can receive publishing consideration by PLATING for your paper. By serving, you will be well-served.

The Editor

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TYPE 255-A

Price: $450.00 F.O.B. Boonton, N. J.

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FILM THICKNESS OF

non-magnetic films on non-magnetic basis metals

SUCH AS:

Silver on Brass
Cadmium on Copper
Silver on 18% Nickel Silver

AND:

Anodic Films on Aluminum
(anodized aluminum)

Organic Paints, Porcelain, Enamel, and other non-conductive coatings on Aluminum, Magnesium, etc.

SORTS
METALS

in accordance with their electrical conductivity

MATCHES
METALS

in accordance with their magnetic properties

The Film Gauge, Type 255-A, measures the plating thickness of most non-magnetic metal combinations in addition to those listed. Fig. 1 shows a typical gauge standard for this type of measurement. The Film Gauge also measures non-conductive coatings such as anodic film on aluminum, magnesium, etc. Fig. 2 shows a gauge standard for this type of measurement. Gauge standards are available as accessories at extra cost.

For sorting or matching metals by their electrical or magnetic properties, no gauge standard is required. Simply select a sample exhibiting the desired characteristics — establish an arbitrary meter reading — sort and/or match by deviations on the meter.

GAUGE STANDARDS
SCALE: 1/2 ACTUAL SIZE

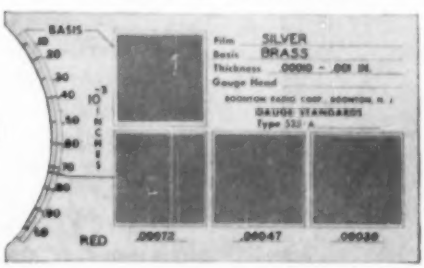

FIG. 1

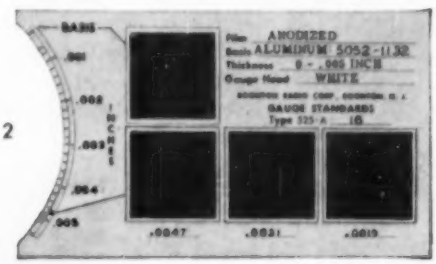

FIG. 2

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A high-tin-content fluoborate bath produces coatings of excellent solderability on electronic or electrical parts where the use of a non-corrosive flux is desired. It also gives a uniform coating that expedites assembly, and where the parts can be fused, the B&A Fluoborate alloy bath can be used to deposit the solder, eliminating costly hand soldering.

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These are high-speed, low-cost operations . . . short-cuts to producing better, more economical products.

The plated coatings shown are actually tailor-made to specific requirements with Baker & Adamson Lead and Tin Fluoborate Solutions. When protective and lubricating coatings are required, as in bearings, lead-tin alloys of low tin content are readily plated. Where a deposit of good solderability is desired, as in electronic parts, alloys with 40-60% tin content can be produced. B&A Lead and Tin Fluoborate Solutions, combined in a bath using alloy anodes, produce dense, fine-grained, uniform deposits with pre-determined characteristics. Send the coupon for detailed technical bulletins.

B&A Fluoborate Plating Chemicals Include:

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Indium • Antimony* • Chromium* • Cobalt*
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GENERAL CHEMICAL DIVISION
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☐ Your Technical Bulletins No. TC38351, RA38351, and RB38351 on applications and techniques for plating lead and tin alloy coatings.

☐ Information on applications of other B&A Metal Fluoborates. Specify type _____

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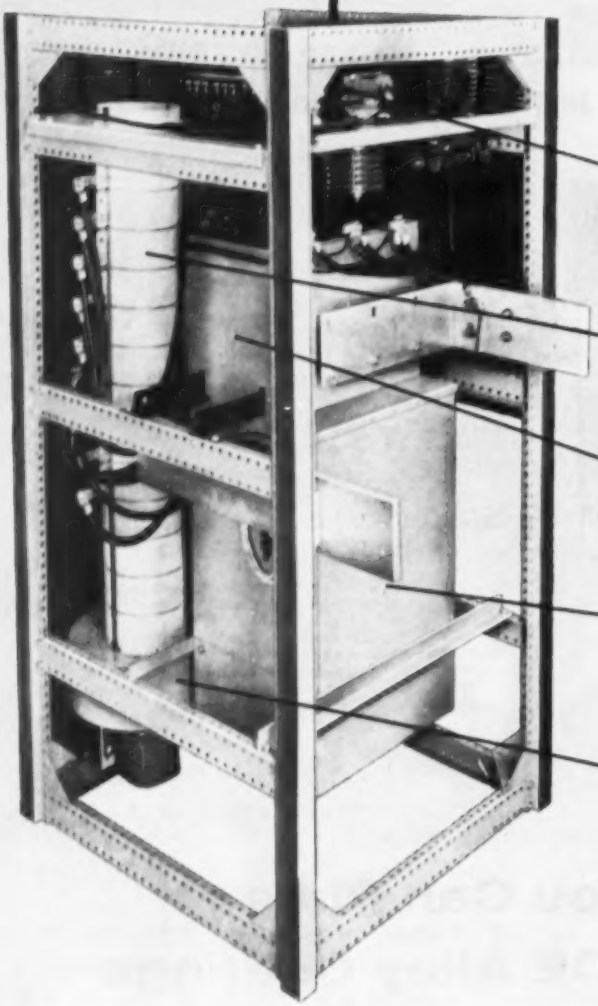

Automatic voltage control contains no moving parts or electronic tubes.

This tube contains time-proven General Electric germanium cells, each hermetically sealed in stainless-steel-ceramic enclosure for maximum corrosion resistance.

Transformer, protected by double-impregnation with alkyd-resin finish.

Reactor provides instant, stepless control plus built-in short-circuit protection.

Powerful blowers supply high-velocity cooling air blast (red line) past cells, through reactor and transformer.

General Electric announces a

TO: GENERAL ELECTRIC COMPANY
Section 463-15, Schenectady 5, N. Y.

Gentlemen:
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COMPLETE with remote automatic voltage control

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With automatic control, you simply set the output you want on the remote-control panel. This output is maintained automatically, regardless of changes in tank load or variations in a-c input voltage. The result is a uniform product from rack to rack—not too much deposition, which wastes valuable anode material, time, and labor; not too little deposition, resulting in costly rework.

The low price results from: (1) successful adaptation to plating equipment of a low-cost saturable reactor circuit, long recognized as the ideal control; and (2) the perfection of a new cooling technique which cools the germanium cells from *both* sides and force-cools the reactor and transformer for long life.

Ratings *are now being built* from 6-volt/750-amp to 250-volt/140,000-amp, air-cooled and water-cooled. Ask your General Electric plating equipment supplier for more information, or send in the coupon for bulletin. General Electric Co., Schenectady 5, N. Y.

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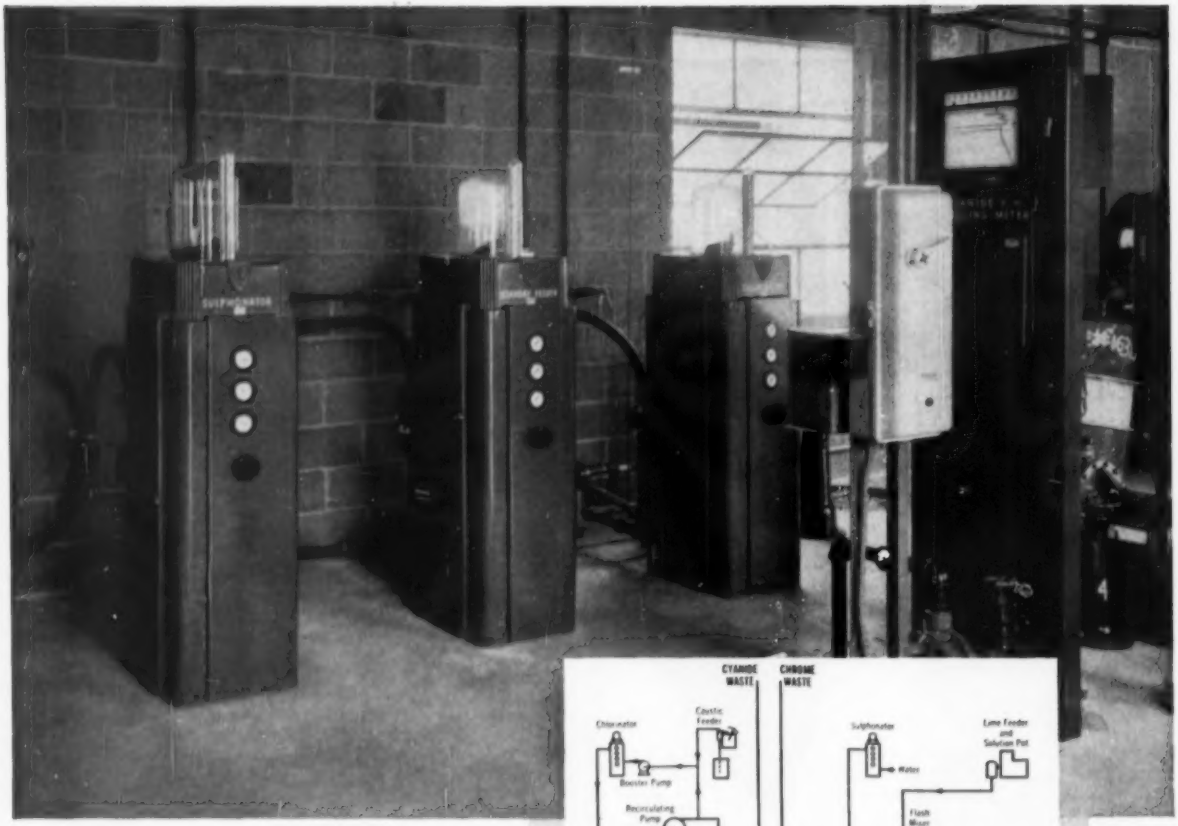

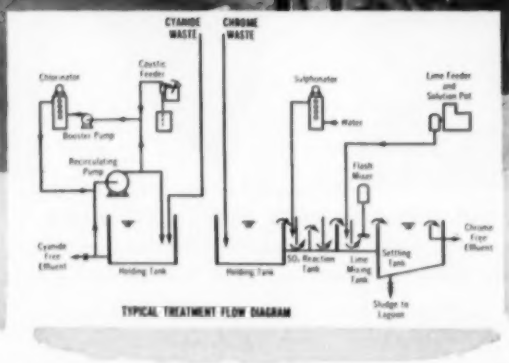

TYPICAL TREATMENT FLOW DIAGRAM

DAYSTROM INSTRUMENT DIVISION USES

W&T *Cyanide & Chrome Waste Treatment*

The Daystrom Instrument Division of Daystrom, Incorporated, located at Archbald, Pennsylvania, has provided a compact and efficient treating plant to destroy the toxic components of their plating waste. The treatment plant has been in continuous operation since 1953.

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If you would like more information on Wallace & Tiernan cyanide or chromium waste treatment, write for bulletin RA-2120-CP.

WALLACE & TIERNAN INCORPORATED

25 MAIN STREET, BELLEVILLE 9, NEW JERSEY

1-52

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year after year, you get
BALANCED QUALITY*
in
MICCROSOL

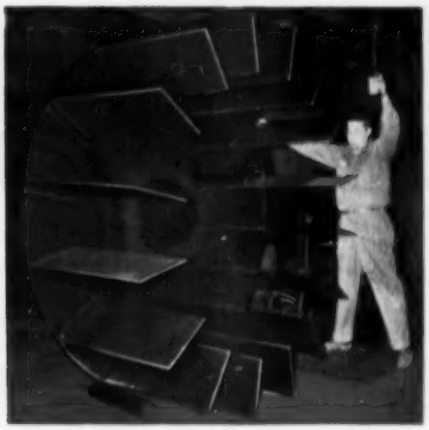
Developed originally as a coating for plating racks, Miccrosol E-1003 has all the desirable characteristics which make it an ideal coating for many other applications.

The chemical resistance of Miccrosol is unequalled in its field. Its toughness, abrasion resistance, resilience, and flexibility are unsurpassed. It's easy to apply in either a *dip* or *spray* formula. When necessary, it's easy to repair.

Year after year we build this quality into Miccrosol, improving it whenever possible and practicing every economy in its manufacture that does not compromise the excellence of the product.

This BALANCED QUALITY enables you to use Miccrosol *profitably* while assuring your customers of coating jobs that will prove superior in their performance.

**Outstanding performance and value*



The above illustrations show Miccrosol being used as a coating: At the left, Miccrosol Spray S-2003 is being applied to a large plating tank. At the right, Miccrosol E-1003 has been applied by dipping this large paddle. Contact us for the name of the qualified Miccrosol coater nearest you.

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Developed and manufactured by experienced platers and coaters

It's Tops!

For tanks, ducts, and other equipment

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1. PRODUCTION PROBLEM: To cut unit costs and increase production of grinding off parting lines and other imperfections, and polishing die-cast aluminum vacuum cleaner nozzles prior to plating. Scott and Fetzer Co., makers of famous Kirby vacuum cleaners, were using set-up wheels in a three-grit sequence – #60, #120, #220 – to do this operation. Production was 6 finished units per hour.

2. SOLUTION: A 3M Representative suggested that this Cleveland, Ohio manufacturer switch to the 3M Method using Three-M-ite Cloth Belts, Grits #120 and #220. This method increased production 116% – from 6 to 13 finished nozzles per hour – *and* eliminated one grinding operation! Too, the finer polished surface obtained with 3M Belts made for far superior final plating.

A 3M Representative can help solve *your* grinding and finishing problems, too. Call him today!

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THE NEWEST ACHIEVEMENT IN COLD SPRAY CLEANING

JET 50 HAS EVERYTHING IT TAKES TO SET NEW RECORDS FOR SPRAY CLEANING EFFICIENCY IN YOUR PLANT.

- A non-foaming spray cleaner that works at room temperature.
- Safe for use on all metals.
- A positive rust inhibitor.
- Moderate cost. Long life at top efficiency.
- Heavy dirt load capacity.
- Maintains pleasant odor even with heavy dirt load.
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- Can be used hot as well as cold. No disposal problem.

Remember — YOUR COST PER FINISHED ARTICLE IS THE TRUE COST OF YOUR CLEANER

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Let the Northwest Cleaning Specialist explain how Jet 50 can improve your production.

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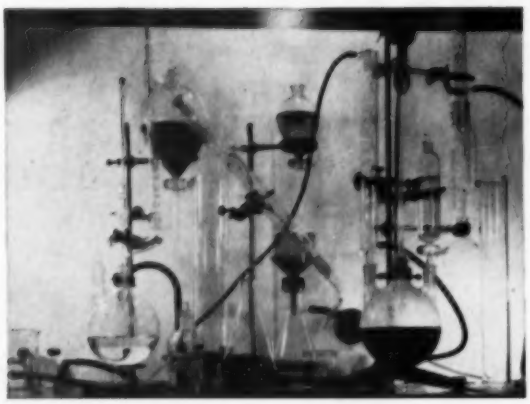
pioneers in pH cleaning control serving you since '32

ONLY ROHCO® Zinc Brighteners Contain COMPOUND Z-10



Enthusiastic acceptance can only be earned by exceptional performance. Compound Z-10 in Rohco Zinc Brighteners is the exclusive ingredient that makes the difference in:

BRIGHTNESS—consistently brightest zinc with simplest control. Highest covering power and widest current density range for uniform deposits.

STAYING POWER—only small additions occasionally required proportional to production. Most economical of any to use.

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Send coupon for information on ROHCO ZINC BRIGHTENERS, today!

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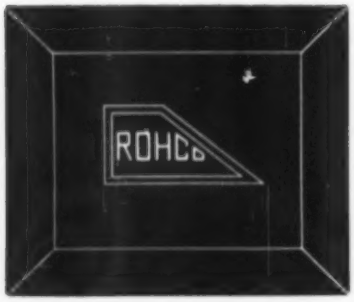

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NEW ...from Du Pont

Improved "Zin-O-Lyte" Brightener Saves Money in Barrel Plating Zinc

NEW "ZIN-O-LYTE" BRIGHTENER SPECIAL

Gives brilliant zinc deposits... right from the barrel... without a bright dip

NOW YOU can get top quality, brilliant zinc plating direct from the barrel without a bright dip, by using "Zin-O-Lyte" brightener—SPECIAL. The new formulation, fully tested in production installations, is designed specifically to cut your brightener costs with no sacrifice in quality of work.

"Zin-O-Lyte" Brightener SPECIAL is compatible with other Du Pont zinc brighteners and generally can be used without change in procedure.

The new "Zin-O-Lyte" brightener is available in non-returnable Fibrepak drums which minimize breakage . . . reduce shipping costs. This readily soluble powder also gives you freedom from freezing or settling out of brightener constituents in storage or transit.

New "Zin-O-Lyte" Brightener SPECIAL is a part of Du Pont's extensive line of plating chemicals. For complete information and arrangements for trial use in your plant, please call or write to our nearest district office or: E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington 98, Del.

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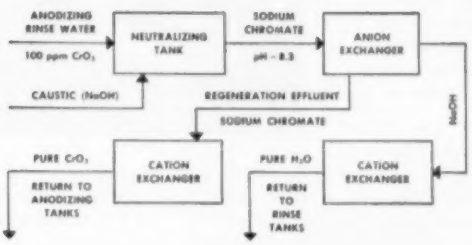

RECOVERY OF CHROMIC ACID FROM ANODIZING RINSE WATER

The block diagram above indicates one method of using ionXchange to save money, in the plating rooms of a large automobile plant, by recovering the chromic acid from the rinse tanks of anodizing operations. The cost of equipment was much less than the cost of a disposal plant, and the savings through recovery were substantial enough to make the investment a very profitable one.

REMOVAL OF ALUMINUM FROM ANODIZING BATH

A secondary purpose for one part of the same installation was the removal of aluminum from the anodizing baths. When the concentration of aluminum in any anodizing tank rose to nearly 1 g. per liter, that tank was cycled through the cation exchanger and the aluminum removed, thus saving over $250 a week compared with partial dumping. *For details on this and many other money-saving applications of ILLCO-WAY ionXchange, write us or consult your Illinois Water Treatment Company representative.*

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Famous FIRSTS

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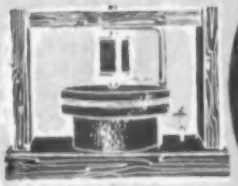
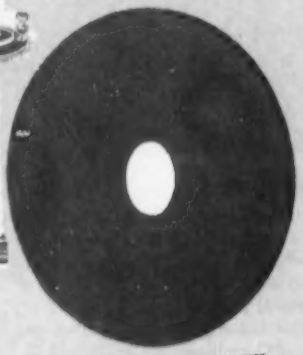
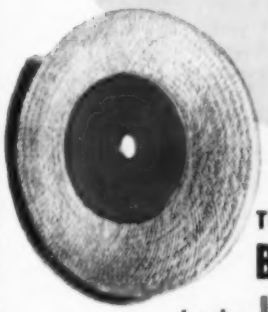




The FIRST TELEPHONE by Alexander Graham Bell

The FIRST AIRPLANE by the Wright Brothers



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INDUSTRY NEWS

Metal & Thermit Expansions—Metal & Thermit Corporation, the country's largest producer of tin chemicals, has purchased a 163-acre site near Carrollton, Kentucky, and will construct a new chemical processing plant.

The 163-acre tract is located one mile east of Carrollton, on U. S. Route 42. The initial development will include an office building, a warehouse building, steam plant, production buildings and minor structures.

The plant will produce organotin chemicals. The products will include a complete line of color stabilizers for polyvinyl chloride resins and other plastics formulations.

Metal & Thermit also operates detinning plants at Carteret, N. J.; East Chicago, Ind., and South San Francisco, Calif. Three plants produce metals and alloys such as high purity chromium, ferrotitanium and nickel titanium, and other chemicals widely used in the electroplating, ceramics and other industries.

An ore processing plant will shortly be under construction.

The new combined office, warehouse and manufacturing facility of Metal & Thermit —United Chromium of Canada, Limited, under construction during most of 1956, has been completed.

The new structure is located on a four-acre tract on Factory Street in the Highbury area of Etobicoke Township in northwestern Toronto. The building, a one and a half story structure, is 80 by 140 ft in size; it is of cinder block construction faced on two sides with brick and is served by both express highway and the Canadian Pacific Railroad.

Products to be manufactured at the Toronto plant will include chromium, copper and nickel plating materials, liquid dips, organic protective coatings and welding compounds. The warehouse stocks will permit carrying ample stocks of the company's other products.

Sel-Rex Changes Corporate Name—In order to avoid the misleading impression that the firm deals only in precious metals, Sel-Rex Precious Metals, Inc., has changed its corporate name to Sel-Rex Corporation. The executive offices are at 155 Manchester Place, Newark 4, N. J.

The Sel-Rex product line has been expanded to include electroplating processes and chemicals, other than precious metals —as well as electroplating equipment of their own design and manufacture.

Among equipment included in the expanded line is the jet plater, a complete electroplating unit in a compact, portable automatic cabinet, with built-in rectifier, filter, automatic timer, and other features usually found in large electroplating installations.

The new chemical line includes this firm's copper purifier, cadmium brightener, zinc barrel brightener, and Lectro-Nic, the compressively stressed nickel plating process recently in the news.

Officers of the new corporation are: M. M. Messing, president; E. C. Rinker, vice president-general manager; L. R. Collart, vice president-treasurer; and F. E. Brearley, assistant secretary.

Canadian Firm Wins Almco Award —Savings of 97 per cent over previous deburring and finishing costs have won an Almco Supersheen award for Canadian Pratt and Whitney Aircraft Company, Ltd. of Montreal.

The award—a $50 check and certificate —was made by Almco of Albert Lea, Minnesota, manufacturer of barrel finishing equipment and compounds. Basis of the award was a $2,430 annual savings on

spark plug bushings used in the Canadian Pratt and Whitney aircraft engine.

The previous cost figure of $104.20 per thousand bushings finished on speed lathes and portable power tools was cut to $2.95 per thousand under the new program. Job reports submitted after converting to controlled processing with modern barrel finishing equipment showed a virtual elimination of rejects.

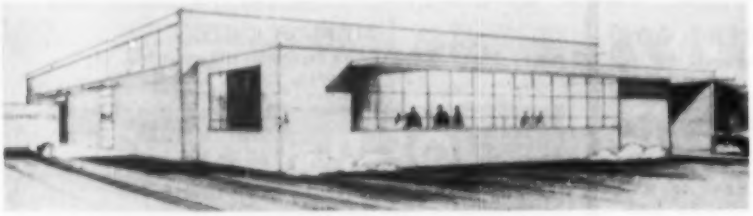
Equipment used by Canadian Pratt and Whitney in winning the Almco award included two DB-200 units with capacity for deburring and finishing 1,000 spark plug bushings in 45 minutes.

Engineering Scholarship—A scholarship to encourage liberal arts students to acquire an engineering education has been established at Illinois Institute of Technology, Chicago, by the International Nickel Company, Inc.

In addition to covering tuition for one year, the award provides $300 for books and living expenses. It is renewable for the second year. A student spends three years in a liberal arts college and two years at IIT to receive both a liberal arts and an engineering degree at the end of five years.

Smelter to Be Built by Federated Metals—The Federated Metals Division of American Smelting and Refining Company will construct a large secondary aluminum smelter at Alton, Illinois. The plant, which will have an annual capacity of 72,000,000 lb of aluminum alloy ingot, will double Federated's present aluminum alloy production. It will be among the largest plants ever built to handle aluminum scrap metals.

According to Frederick Walker, vice president in charge of the Federated Metals Division, the plant will be the most modern smelter of its type ever constructed. Self-sufficient laboratories containing quantometric and chemical testing facilities are included in the plan. Modern scrap handling, furnacing, casting, ingot handling and shipping facilities will give the plant unusual flexibility.



New Metal & Thermit Toronto plant. The Kentucky plant at top of page.

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fast cutting, easy cleaning with

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the perfect liquid compound for all metal finishing

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Liquimatic saves on production costs because it's completely automatic. An electrically timed system feeds Liquimatic Compound to the buff in exactly the right amount to produce the exact rate of cut you need. There's no compound wasted, no nubbin problem. No hand application, no changing bars, either—can you see any savings here in your buffing room?

Check the other features of Liquimatic Liquid Buffing Compound... then write today for your free copy of Liquimatic's folder that tells the whole cost-saving story of Liquimatic in *your* buffing room.

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gives more buff mileage

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With labor costs going higher constantly any savings become more important. Today the use of True Brite Brass Maintenance Solution or Compound can represent even more savings. This material will maintain your brass solution without frequent skilled attention. The directions are so simple anyone can follow them. Ordinary analysis at intervals can be made as usual and corrections made as necessary.

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The additions are simply 1 quart of True Brite Brass Maintenance Solution per 100 ampere hours or 1 lb. of Brass Maintenance Compound per 200 ampere hours. No ampere hour meter is necessary and additions are usually made once per day or shift.

●

The cost is low as we manufacture the copper and zinc cyanide we use. It should be emphasized that these are complete maintenance materials containing the cyanides necessary for normal maintenance and not just an addition agent.

●

This is not an experimental idea but has been widely used by many large concerns and we could produce reams of testimony from satisfied customers. The same solutions are used for both barrel and still tanks.

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Efficiency of plating is good and slight changes in temperature can change color slightly to match parts.

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The operation is generally comparable to the so-called bright brass plating solutions but lower in cost and more trouble free.

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If you want to match the rich-low brass (bronze) colors we have special materials to help you. More attention is required for these colors but they can be produced consistently.

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If you haven't already gotten our bulletin on brass plating or our bulletin on rich-low brass plating we have copies for you. Why don't you, too, join the ranks of better brass platers who are using our materials?

TRUE BRITE CHEMICAL PRODUCTS CO.
98 FALLS AVENUE OAKVILLE, CONN.

INDUSTRY NEWS BRIEFS

● Sylvania Electric Products Inc. has taken options on a 150-acre site in Andover, Mass., as the proposed location for a new multi-million-dollar atomic center for the purpose of expanded research, development, and production activities in the atomic energy field.

Walter E. Kingston, general manager of Sylvania's Atomic Energy Division, said that the options have been taken by Sylvania pending the formation of Sylvania-Corning Nuclear Corporation, which will be organized as a jointly-owned company in the next several months by Sylvania and Corning Glass Works.

● Consumption of nickel in September 1956 was 9 per cent more than in August, but imports were 39 per cent less, according to the Bureau of Mines, United States Department of the Interior. The first nine-months use amounted to 123,000,000 lb of metal.

Total use of metal for all of 1955 was 152.6 million lb.

● Production of cadmium at domestic plants in the third quarter of 1956 was 2,497,000 lb, 7 per cent below the preceding quarter, but 18 per cent above the similar quarter of 1955.

Metal producers' shipments, including that for internal consumption, were 2,271,000 lb, 19 per cent below the second quarter of 1956 and 14 per cent below the third quarter of 1955.

● The zinc industry participated in the general rise of industrial activity in the United States in 1955. Production and consumption of slab zinc reached an all-time high, and mine output of recoverable zinc increased moderately. An upward trend in the price of zinc, which began in March 1954, continued through 1955. The increase in consumption, coupled with sustained Government purchases for the National Stockpile, reduced smelter stocks of slab zinc to the lowest level since June 1952 despite an increase in general imports of zinc. Consumers' stocks, however, increased moderately.

● The Senate Small Business Committee, headed by Senator John Sparkman released a report on December 10 charging that "the brunt of the nickel shortage has been borne by small business, specifically, by 3000 job electro plating shops employing approximately 50,000 workers."

The committee circularized seven main plating supply houses and "the major producer of nickel" to secure figures on the amount of nickel available for civilian use.

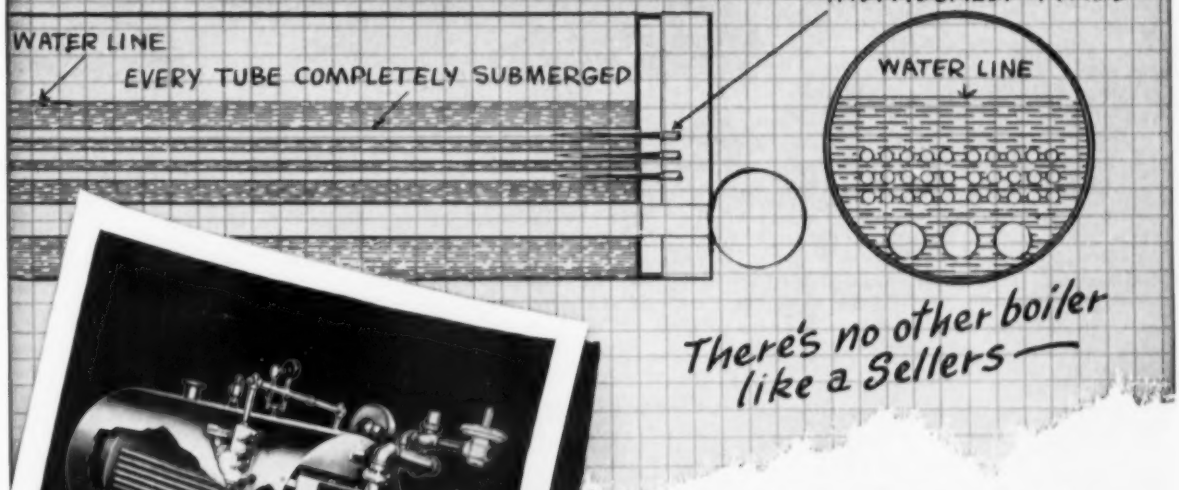
The results of these inquiries, according to the report, show the following percentages received by the platers:

Year	Available (in million lbs)	Per cent to platers
1948	185	13.1
1949	135	15.0
1950	186	15.2
1951	113	6.7
1952	105	9.7
1953	123	13.4
1954	133	15.8
1955	145	13.8
1956— (5 mos.)	59.7	16.9

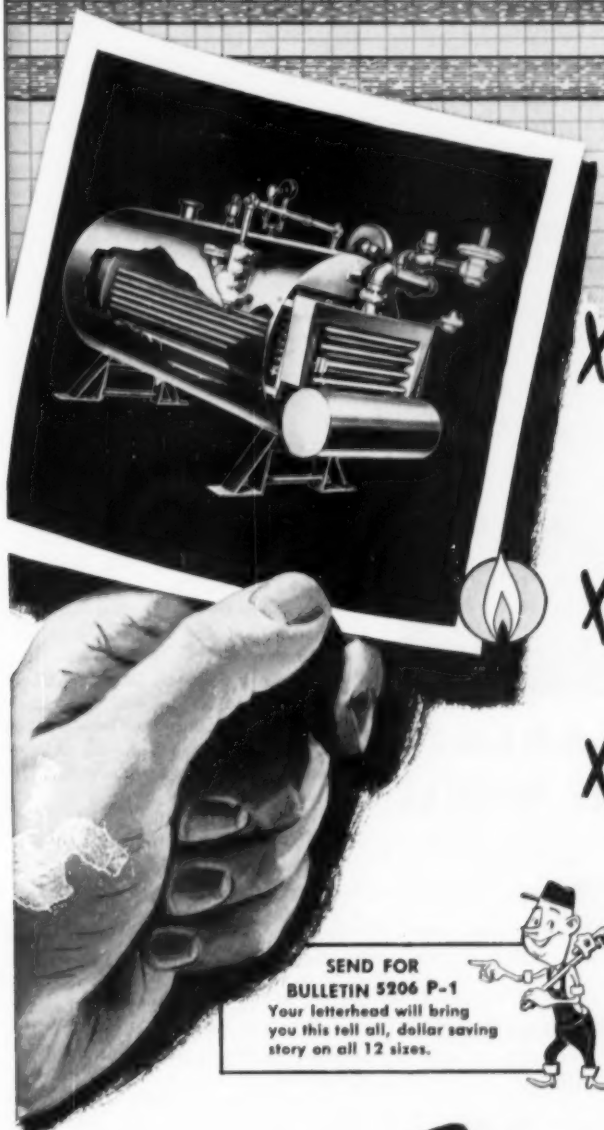
The committee made several recommendations. It stated that the present systems of allocations in the electro plating industry should be "correlated as between primary producers and the plating suppliers or scrapped in favor of an allocation system related to the present plating capacity of electro platers."

The report also urged that abuses of the defense-rating system on nickel should "be stamped out."

when you buy a steam boiler . . . be sure to look at the picture of a Sellers Immersion Boiler



There's no other boiler like a Sellers—



every square foot of heating surface is water backed— —100% effective!

The long, individually gas fired tubes in the Sellers Immersion Boiler are all completely submerged nearer the water level—and over the return tubes! Heat is therefore uniformly distributed through them—and directly into the water—no where else!

there's no scale problem!

In immersion heating, the needed long tubes expand and contract sufficiently on intermittent firing to crack loose any hard scale that forms on the tubes. This practically eliminates the scale problem, makes maintenance simpler and increases the boiler's efficiency.

the average flue gas travel is 15 feet!

Maximum, almost complete utilization of the exhaust heat is assured with a Sellers Immersion Boiler. This is a result of Sellers exclusive design—with the firing tubes completely submerged and *located over the return tubes,* there is a long, slow flue gas travel—an average of 15 feet! Heat can only go into the water.

There's no other steam boiler like a Sellers Immersion Steam Boiler. Its simple design gives you a package boiler unit with many other outstanding features. Minimum maintenance and maximum efficiency combine to give you years of remarkably low operating costs. Twelve sizes available!

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Blast Heaters • Immersion Automatic Water Heaters • Combustion Units • Industrial Gas Burners
Vertical Steam Boilers • Immersion Tank Heaters • Gas Combustion Equipment

INDUSTRY NEWS

Rigid Plastics Research—Horizons Incorporated, Cleveland industrial and governmental materials research organization, has undertaken the preliminary steps under a contract with a synthetic resin producer to find a means of reinforcing certain rigid plastics to withstand higher temperatures.

Rigid plastics are used for corrosion resistant vessels, industrial and commercial ventilating systems where corrosive fumes and vapors are present, piping and ducting for corrosive materials and many other anti-corrosion applications. General applications will be broadened when the service temperature is raised sufficiently to withstand those temperatures necessary in many manufacturing processes.

Steel frame work for American Plating's addition.

American Plating Building Addition—American Plating, Inc. is building a major addition to its 10,000 sq ft plating plant at Zelienople, Pa. Plant space will be enlarged by 80 per cent.

"The expansion is necessary to meet increased Tri-State area demands for electroplating and electrogalvanizing services," says B. W. Carbeau, general manager.

Utilizing zinc, hard chromium, cadmium and other metals to plate small and very large products, American Plating now serves over seventy industrial firms in Western Pennsylvania, Northern West Virginia and Eastern Ohio.

Largest Germanium Rectifier for Diamond Alkali—The General Electric Company has an order from Diamond Alkali Company for installation of the nation's largest germanium power rectifier system at this chemical producer's Deer Park plant near Houston, Texas.

The order calls for an installation rated at 35,000 KW-250 d-c volts, and is the first U. S. sale at a voltage rating above 150.

Diamond Alkali will use its equipment to provide direct current to a chlorine cell installation, which is part of a multi-million-dollar expansion program at the Deer Park plant. The additional facilities are expected to be completed and put into operation during the first half of 1958.

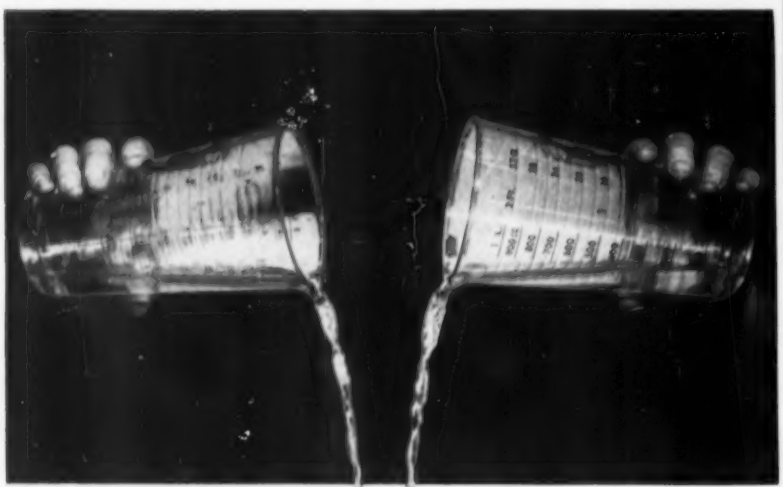
The germanium rectifier system was designed in co-operation with Diamond Alkali by a General Electric team of headquarters and district application engineers, together with design engineers from the Rectifier Department.

The single purchase by Diamond Alkali exceeds the total capacity of 10 rectifier installations made since the General Electric Company pioneered the first large germanium power rectifier equipments in 1953.

Du Pont's New Sulfuric Acid Plant—The Du Pont Company's new Fort Hill Works, near Columbia Park, Ohio, is now producing sulfuric acid.

The new plant, operated by the Grasselli Chemicals Department, marks the end of an era in the company's sulfuric acid production, by replacing the last chamber manufacturing process located at the Lockland Works which has ceased all operations.

Start-up of the Fort Hill Works is the latest step in Du Pont's long-range modernization program of sulfuric acid manufacturing facilities. Since the end of World War II, this program has included construction of a new plant at Richmond, Va., and installation of new manufacturing units at company plants at Cleveland, Ohio; Linden, N. J.; and East Chicago,



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It's *easy* to control plating operations when you use Seymour Bright Nickel processes because only two addition agents are needed to insure efficient deposition on ferrous and non-ferrous alloys as well as copper-plated zinc base alloys. Seymour gives you this minimum of control with freedom from hydrogen pitting . . .

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99.75% Chromic Acid

% purity

Cr_2O_3 . . . . . 99.75% MIN. SO_4 . . . . . 0.1% MAX.

When a commercial chemical runs 99.75% pure, the user need not ordinarily concern himself about the remaining 0.25%. In chromium plating, however, the 0.25% is important because it includes whatever sulfate is present.

While the maximum amount of sulfate permitted in Mutual Chromic Acid is only 0.1%, average production is well below that figure. Furthermore, the sulfate content varies but little from drum to drum. No other impurity exceeds 0.01%. The balance represents a trace of moisture which, of course, is harmless. This close attention to small details is one reason for the wide acceptance of the Mutual label wherever quality chromium plating is performed.

Sodium Bichromate • Chromic Acid • Potassium Bichromate

MUTUAL CHEMICAL DIVISION

MUTUAL — ALLIED CHEMICAL & DYE CORPORATION

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FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 120.

INDUSTRY NEWS

Ind. The East Chicago installation, which began commercial operations in early 1955, is the world's largest single unit. The Grasselli Chemicals Department also manufactures sulfuric acid at Toledo, Ohio; Ecorse, Mich.; and Wurtland, Ky.

New Nankervis Plant—George L. Nankervis Company is occupying its new multi-million dollar plant designed to accommodate its own manufacturing operations and those of its recently acquired subsidiary, the Commercial Research Division. Located on a 5-acre site in Northwest Detroit, the new plant comprises approximately 90,000 square feet. Large areas of glass and brick and one story construction give the plant modern appearance. Off-street parking is provided for 300 cars.

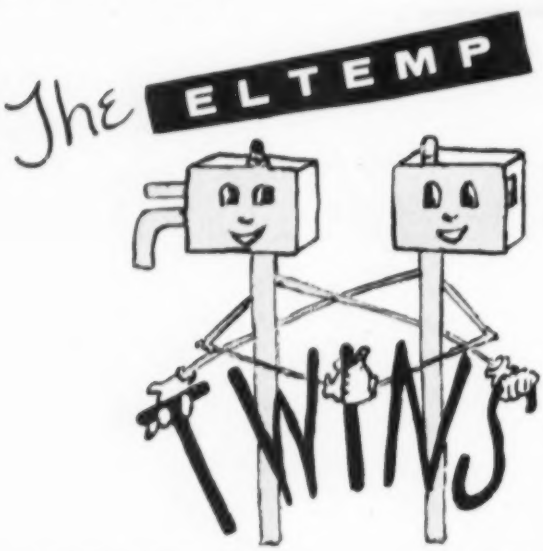
Devoted exclusively to the manufacture of testing equipment, the plant is unique in layout. All manufacturing activities, such as sheet metal fabrication, metal finishing, electrical, mechanical, testing and calibration, flowmeter assembly, etc. are grouped around a general assembly area allowing a natural flow of work throughout the plant. Five traveling bridge cranes cover the manufacturing area enabling motors, transmissions, large assemblies, etc. to be handled with ease.

Small Firm Research—James O. Bengston, president of Chicago Apparatus Company, scientific apparatus firm, has commented that a research laboratory investment as low as $5,000 can pay off for many companies. The important thing, he said, is to work toward a specific target such as new production techniques or lower maintenance cost. On the other hand, the firm that hopes to develop an entirely new product is taking a substantial risk, he added.

"In the last 25 years," he pointed out, "the average dollar invested in science returned a dividend of $60. The return will be as great or greater in the next 25 years, we are assured, and the small company must get its share."

Small companies, according to Bengston, have good prospects of benefiting from research through:

1. Lowering the cost of production.
2. Decreasing maintenance cost of old products.
3. Increasing the useful life of existing products.
4. Expanding markets for old products by improving their utility, quality, or appearance.



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For Chemical Solutions

Acid Resistant
+
Simple Design
+
NO Moving or Electrical Parts
+
Maintains Solution Level ±3/8 in.

= Positive and Safe Way to add water to maintain desired level of any chemical solution having a specific gravity of 1.140 or heavier. Tanks must be at least 3 ft. deep.

Several Models—$28.50 up

For complete information write Dept. EL

ELTEMP THERMOSTAT
For Chemical Solutions

Acid Resistant
+
Dependability
+
Accurate Operation
+
Simplicity

= Years of Satisfactory Service. The Eltemp Thermostat automatically regulates the operation of heating or cooling sources to a temperature tolerance of ±1° F. in solutions having a constant level.

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To give clean permanence to your copies of PLATING, this attractive, hard-covered binder is perfect. It has the AES emblem embossed in gold leaf on its back as well as the name and the year. (Please indicate year wanted.)

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add .70 for firm name)

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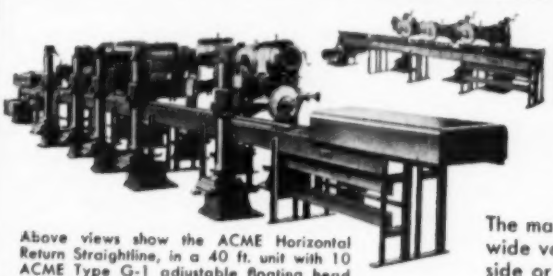
ACME *Automatics* PUT POLISHING *and* BUFFING OPERATIONS *on a low cost production basis . . .*

ACME *Semi-Automatics*

ACME Semi-Automatics are built to "deliver the goods." They can be fully relied upon to cut finishing costs, maintain production levels and stand up under long hours of operation!

The three ACME Semi-Automatics above are from left to right, the ACME A-2, a 2 spindle hand indexing machine for polishing and buffing cylindrical parts up to 12" diameter . . . the ACME L-4, a 4 spindle automatic indexing machine with a normal range of 250 to 400 indexes per hour . . . and the ACME D-10, an oscillating machine for finishing out of round parts. These machines are proved producers.

WRITE FOR CATALOG ILLUSTRATING WIDE RANGE OF TYPES



Above views show the ACME Horizontal Return Straightline, in a 40 ft. unit with 10 ACME Type G-1 adjustable floating head polishing and buffing lathes . . . and a 20 ft. unit with 3 ACME Type G-3 lathes.

ACME *Straight Lines*

ACME Straightlines provide effective solutions to many finishing problems. ACME progressive experience and engineering assure dependable performance at high production levels.

The machine illustrated is unusually versatile and adaptable to a wide variety of work. It may be loaded or unloaded from either side or either end. Polishing and buffing heads may be used on either or both sides and may vary in number to suit the required production and finish.

WRITE FOR OUR STRAIGHTLINE CATALOG ILLUSTRATING OTHER TYPES

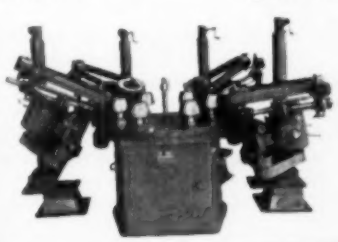
ACME *Rotary Automatics . . .*

ACME 40" Rotary with 6 station indexing table and 4 ACME Type G-1 lathes with belt arm attachment. One second indexing time . . . up to 1800 indexes per hour. Acme Indexing Rotaries are available in table sizes from 18 in. to 10 ft. diameter.

ACME 10 ft. Combination Rotary . . . for continuous operation using 24 continuously revolving spindles or for 12 station indexing operation using every other spindle. One second indexing time . . . up to 1200 indexes per hour.

ACME 50" Continuous Rotary Automatic with 40 spindles equipped with 4 Acme Type G-3 heavy duty 15 H.P. polishing and buffing lathes with inverted spindles. ACME Continuous Rotaries are available with tables up to 24 ft. diameter.

WRITE FOR ROTARY CATALOG



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PERSONALS

Patrick

Suter

Tatoian

Fuelling

J. Douglas Patrick has been appointed to the post of product development engineer by MacDermid, Incorporated, Waterbury, Conn., to expand new product service facilities.

Under Mr. Patrick's direction, MacDermid product development, originating in the company's research laboratories and tested in the customer service laboratory, will be field tested under production conditions in customers' plants. He brings to the company 16 years of metal cleaning, plating and finishing experience.

Mr. Patrick has been active in all phases of metal finishing as foreman, superintendent of plating and process engineer, having been until recently with the Electrochemical Section of General Motor's Frigidaire Division. He is an active member of the AES and the Electrochemical Society.

Harold R. Suter has been made technical director of the J. B. Ford Division of Wyandotte Chemicals Corp. He will coordinate the activities of Ford Division research, technical service, manufacturing and engineering departments.

A graduate and ex-faculty member of the Detroit Institute of Technology, Mr. Suter was instrumental in the establishment and operation of a chemical equipment business. He joined Wyandotte Chemicals in 1942 as a research chemist, advanced to director of application research and now to his new position.

Maurice G. Kramer continues as director of research of the J. B. Ford Division and will direct Wyandotte's metal cleaning, food industries, laundry and textile laboratories.

Jack Cole has been appointed head of production for Regco, division of Crown Chemical and Engineering, Culver City, Calif., manufacturers of DC power supplies.

He will be responsible for the expanded manufacturing program at Regco which has recently added a line of electro plating power supplies.

The company, formerly Regulator Engineering and Development Co., was purchased recently by Crown Chemical and Engineering of Los Angeles, manufacturers of electro plating equipment.

George Tatoian has been appointed sales manager, Patwin Instruments Division, of The Patent Button Co., Waterbury, Conn. according to T. W. Witherspoon, director of sales. Mr. Tatoian was formerly chemical engineer on the research staff of The Patent Button Co. He received a BS degree in chemical engineering, at the Missouri School of Mines and Metallurgy, University of Missouri in 1944. He has been with the Patwin Instruments Division in Waterbury since 1947, and is a member of the AES.

Charles L. Fuelling has been appointed to the technical sales staff of Diamond Alkali Co's. Chromium Chemicals Division.

Widely known in the electroplating and metal-finishing industry, Mr. Fuelling comes to the Diamond organization from Detrex Chemical Industries, Inc., Detroit, where he was engaged in technical service work on phosphates and alkali compounds.

He will make his headquarters at the Diamond Research Center in Painesville.

Mr. Fuelling's production experience includes two years as a finishing consultant, several months as plating foreman for Advance Plating Co., Cleveland, and a similar period as finishing superintendent for Roller-Smith Corp., Bethlehem, Pa. For two years he also was assistant foreman of the plating and galvanizing department at American Steel and Wire Company, Cleveland.

From 1946 to 1953, he was associated with the Plating Division of The Harshaw Chemical Co., following U. S. Army service.

Graduated in 1938 with an AB degree from Wittenberg College, Springfield, he is a member of the AES.

Charles K. Kaiser has been appointed agent for Pennsalt Chemicals' line of corrosion-resistant products in Eastern and Upper Michigan.

Mr. Kaiser, an alumnus of Detroit University, will handle the full line of Pennsalt coatings, cement mortars and interliners for corrosion-proof masonry construction and offer complete professional services in design and specification of chemical-resistant construction and coatings.

F. John Pichard has been advanced to the post of manager, standard equipment sales at Wheelabrator Corp., Mishawaka, Ind. The company is a manufacturer of airless blast, air blast, and wet blast metal cleaning and finishing equipment, plus dust and fume control equipment. Assisting general sales manager E. A. Rich, Mr. Pichard will coordinate the application of equipment of the company's standard designs to appropriate cleaning and finishing problems.

Louis E. Carr's appointment as sales and service engineer in the Wisconsin-Minnesota area for The George A. Stutz Co. has been announced.

Mr. Carr is a registered engineer and a graduate of Purdue University. He has been engaged in sales work in the metal finishing field for several years and is well known in the area that he will be covering.

Previous experience includes a year as plating supervisor for the Rutenber Electric Co. of Marion, Ind.

Armand W. Faucher has been assigned as sales and technical representative of The Chemical Corporation in central and northern Connecticut, calling on the metal finishing trade.

Mr. Faucher is a resident of West Hartford and has an extensive background in metal finishing chemistry. He attended the University of Connecticut and took special courses at Yale. His twenty years experience in the laboratory as an electrochemist at Underwood Corp. was followed by two years as chief chemist at Royal Typewriter. He has since served his present firm as a chemist and technical service man.

Well-known in the plating industry, Mr. Faucher is an active member of the American Chemical Society, the Electrochemical Society, American Society for Metals, the Institute of Metal Finishing, the Faraday Society and the AES. He is currently educational advisor of the Hartford Branch AES.

DeWitt L. Alexandre has been elected a vice president of Baker & Co., Inc., of Newark, N. J., refiner of precious metals. Mr. Alexandre joined Engelhard Industries, of which Baker & Co. is a member, in 1953 as assistant to the president. He formerly was associated with the Spool Cotton Co., now Coats & Clark, Inc.

Roy Zahn has been named sales engineer for the Abrasives Division of Elgin National Watch Co. in the New England states.

He will handle sales of the company's line of diamond compound, carbide rotary tools and Elgiloy, a non-corrosive spring alloy. He succeeds H. Paul Loewenberg, who has left the Elgin organization.

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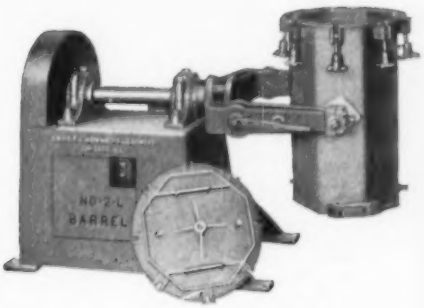

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TECHNICAL PROCEEDINGS (1956): AVAILABLE FOR ORDER

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Filter Media by *J. M. Hood, E. Lundberg, Q. O. Shockley and M. L. Whitehurst*
The Growth and Properties of Metal Whiskers by *S. M. Arnold*
Enameling of Chromium Plate by *G. L. Leithauser*
Tank Linings by *K. G. LeFevre*
Coating Thickness Measurement by Filtered X-Ray Fluorescence by *F. A. Achey and Dr. E. J. Serfass*
(AES Project 5) Effects of Impurities and Purification of Electroplating Solutions. I. Nickel Solutions.
9. The Effect and Removal of Aluminum by *Dr. D. T. Ewing, Dr. A. J. Smith and Dr. W. O. Dow, Jr.*
10. The Effect and Removal of Manganese by *Dr. A. J. Smith and Dr. R. J. Rowe*
(AES Project 15) Progress Report on Accelerated Corrosion Tests for the Performance of Plated Coatings by *W. L. Pinner*
Complete Polarographic Analysis of Cyanide Zinc Plating Baths Using a Simplified Apparatus by *T. H. Collard, Jr. and D. K. H. Liu*
Leveling—Definition, Measurement and Understanding by *J. D. Thomas*
Gold-Silver Alloy Plating by *Dr. R. E. Harr and A. G. Cafferty*
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The Protection of Molybdenum Against High Temperature Oxidation by *J. J. Harwood*
The Polarographic Determination of Cadmium and Cyanide in Alkaline Cadmium Plating Solutions by *G. T. Forsyth*
Spectrochemical Determination of Nickel in Bright Cadmium Plating Solutions by *H. R. Friedberg and M. L. Levy*
Gauging of Thin Nickel Coatings by X-Ray Fluorescence by *W. W. Sellers, Jr. and Dr. K. G. Carroll*
A Study of the Effect of Several Organic Addition Agents on the Hardness and Residual Stress in Nickel Deposits by *I. L. Newell*
Properties of Electrodeposits at Elevated Temperatures by *W. H. Safranek and G. R. Schaer*
Dissolved Gases in Plating Baths by *W. M. Tucker and F. O. Beuckman*
The Adhesion of Electroplated Coatings to Titanium by *C. L. Stanley and Dr. A. Brenner*
A Tool for Decision—Acceptance Sampling by Variables and How it Works by *R. H. Moore*
Some Characteristics of Electroformed Iron Deposits by *Dr. A. M. Max and Dr. G. R. Van Houten*
Some Notes on the Electrodeposition of Antimony by *A. H. Du Rose*
Improved Techniques for Electroless Nickel Plating on Nonconductors by *Dr. H. Narcus*
A New Organo-Aluminum Chloride Bath for Deposition of Aluminum by *Dr. N. F. Murphy and Dr. A. C. Doumas*
Overlay Plating of Steel-Back Aluminum-Lined Sleeve Bearings by *A. H. Beebe, Jr., B. F. Rothschild and G. J. LeBrasse*
Current Distribution on Microprofiles by *Dr. D. G. Foulke and Dr. O. Kardos*
Part I
Part II
Study of Phosphate Treatment of Metals by *L. O. Gilbert*
Electrodeposition of Porous Nickel-Cadmium Alloy by *Dr. L. D. McGraw, J. P. Spenard and Dr. C. L. Faust*
Study of Adhesion by the High Speed Rotor Technique by *Dr. J. W. Beams*
Nickel-Iron Alloy Electrodeposits for Magnetic Shielding by *Dr. I. W. Wolf and V. P. McConnell*
Electroplating Chromium on Unusual Alloys by *C. Levy*
Rapid Analysis of Cyanide Plating Baths by *Dr. R. F. Muraca*
Limitations of Plated Nickel in Jet Engine Design by *R. W. Moeller and W. A. Snell*
Effect of Corrosion on the Gas Permeability of Nickel Electrodeposits by *Dr. D. G. Foulke and Dr. J. M. Tobin*
Construction and Operating Characteristics of a New Electroplating Cell for Current Density Studies by *R. F. Wallon and Dr. R. Gilmont*
Some Recent Developments in Selective, Localized Plating for Engineering Purposes by *M. Rubinstein*
(AES Project 13) The Nature, Cause and Effect of Porosity in Electrodeposits. II. Radiographic Detection of Porosity in Electrodeposits by *F. Ogburn and M. Hilkert*
Chromium Plating of Gun Bores by *Dr. V. A. Lamb and J. P. Young*
Investigation and Evaluation of Plating Processes and Plated Combinations for Use on Etched Circuitry by *E. H. Babcock, R. K. Stephens and R. C. Grimsinger*

The 43rd Annual Convention of the American Electroplaters' Society (AES) held in Washington this past June has passed into history with distinction. In ten educational sessions, more than any recent AES annual members' assembly, it produced 42 papers of high standard by some 70 authors or co-authors of competence and reputation. Each of these enrich the technical and scientific knowledge in the field of electroplating, metal finishing and allied arts.

So as to satisfy the thirst for technical and scientific knowledge of its 7200 members here and globally, the AES has published all these papers in book form together with their charts, diagrams, graphs and other illustrations, and with the verbatim discussion that followed their delivery.

Inasmuch as these convention papers will not this year also be published in PLATING MAGAZINE as in other years, this book is the only printed medium in which all of these 42 papers, and the prodigious wealth of technical and scientific knowledge that they impart, will be published.

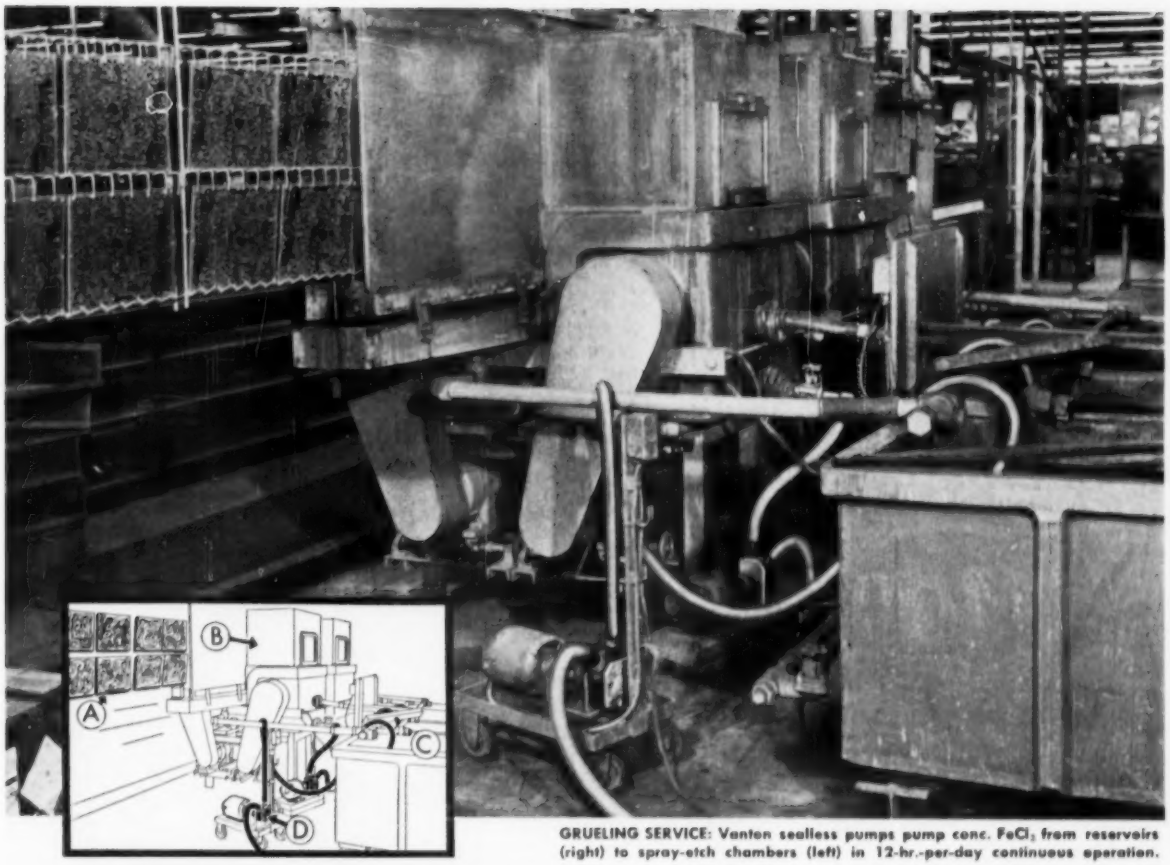
This unique book, larger than any of its predecessors, totals 308 pages compared with the 255 of last year's edition. Its scope and coverage is demonstrated by its array of papers listed at left.

AES headquarters has received a number of inquiries from non-members regarding the availability of copies for purchase—and its market price.

Because of the stature of members' needs, only a comparatively limited quantity of TECHNICAL PROCEEDINGS still exists for sale to non-members. Out of a deep desire to be helpful to those non-members who recognize the book's import and value, *orders will be accepted and serviced by the AES on strictly a first-come first-served basis so long as its limited supply of* TECHNICAL PROCEEDINGS *lasts.*

The domestic cost of the book is $12.50 per copy including postage. To those ordering it from outside of the United States' continental limits, the charge is $15.00 per copy including postage cost. *All orders must be accompanied by payment in full in order to obviate unnecessary bookkeeping expense.* Address orders to the

AMERICAN ELECTROPLATERS' SOCIETY, INC.
445 BROAD STREET • NEWARK 2, N. J.



GRUELING SERVICE: Vanton sealless pumps pump conc. $FeCl_3$ from reservoirs (right) to spray-etch chambers (left) in 12-hr.-per-day continuous operation.

at WESTINGHOUSE's TV-Radio plant in Metuchen, N. J.

3 Vanton Sealless Pumps minimize maintenance problems in pumping ferric chloride for printed-circuit etching

PRINTED-CIRCUIT PROCESS — Copper foil laminated to baseboard has circuit diagram silk-screened with acid-resistant ink (A). Conveyed into etching equipment (B), excess copper foil not covered by resist ink is etched away by warm conc. $FeCl_3$. Later, vapor degreaser removes acid-resistant ink, exposing remaining copper circuit.

PUMPING PROBLEM—$FeCl_3$ is pumped continuously from reservoirs (C) (overflow return), to provide fresh liquor for spray-etch chambers. Before Vanton came on job, high corrosiveness of $FeCl_3$ and abrasiveness of crystals caused much trouble with conventional pumps. Leakage at packing caused crystallization, with abrasion and scoring of pumpshafts, and expense and nuisance of increased maintenance.

VANTON SOLUTION — When Westinghouse changed to Vanton sealless pumps, these packing problems ceased. Each of 2 etch chambers has its own Vanton pump delivering $FeCl_3$ from its reservoir. Third Vanton pump (D, foreground) is movable auxiliary, used for cleanout of etch-spray chambers and reservoirs when $FeCl_3$ batch is exhausted. Vanton plastic materials of construction eliminated the problem of corrosion. A bakelite body block and natural rubber flex-i-liner proved completely impervious to the $FeCl_3$. Maintenance was reduced to the infrequent and simple replacement of the inexpensive flex-i-liner.

HOW VANTON PUMP WORKS • Liquid flows in channel between molded plastic body and synthetic flex-i-liner (*1*). No liquid touches metal. Liner flanges secured to plastic body block by bolted face plates (*2*). • Pumping mechanism is rotor mounted on eccentric shaft (*3*). At each revolution it pushes liner against body block and sweeps a "slug" of liquid around the circular track from inlet to outlet. • All bearings are outside of fluid area and located within protective stainless steel assembly in the event of flex-i-liner failure (*4*). • Liners are replaced in minutes, with pump in place, by simply removing face bolts and face plate, slipping old liner out, new one in (*5*).

CHECK THESE VANTON SEALLESS PUMP ADVANTAGES!

- **No stuffing box or mechanical seal to leak, contaminate, or require maintenance.**
- **Self priming; high vacuum.**
- **A full-time production tool.**
- **Broad capacity range, 1/3-20 GPM.**
- **Available in 7 body and 10 flex-i-liner materials, to handle a wide variety of corrosives and abrasives.**

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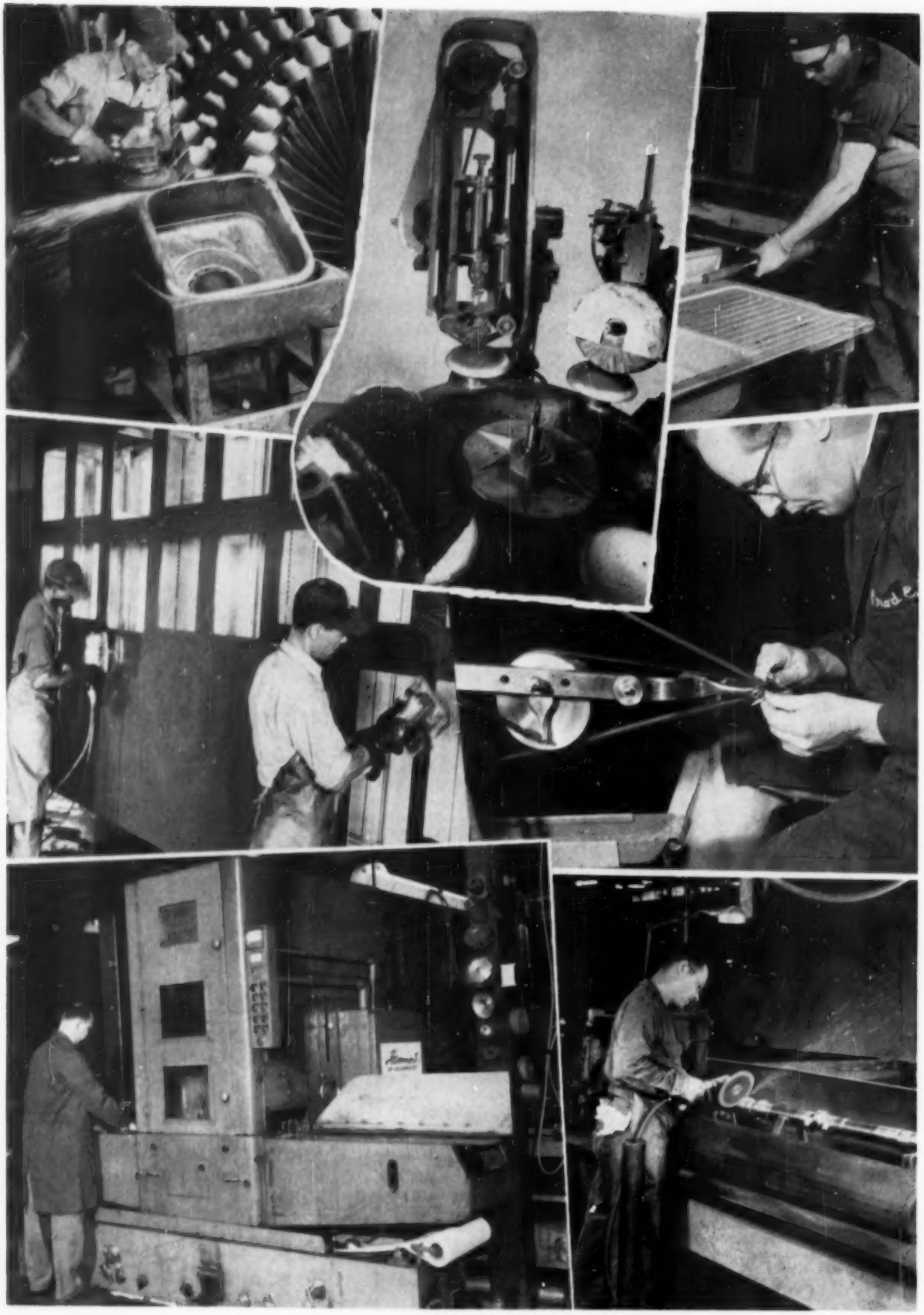


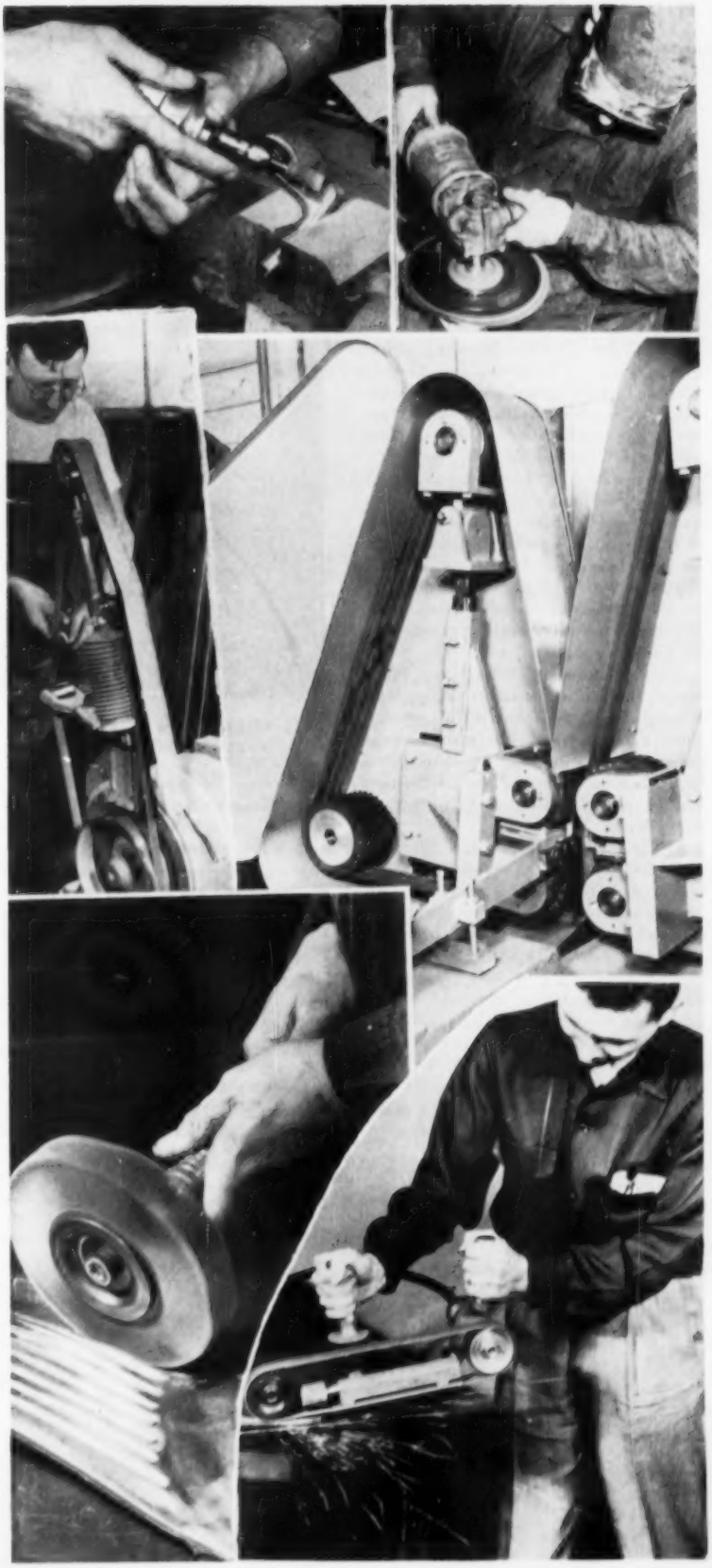
Abrasive Finishing of Metals

On this and the opposite page are pictured a few of the many products and new techniques exhibited at the Second National Metal Finishing Show held this fall in Cleveland under the sponsorship of Behr-Manning Co., division of Norton Co. Many of the demonstrations were being made for the first time.

In the *upper left* corner of the opposite page is shown an air-powered vertical sander polishing a drawn steel tub, using a 9-in. coated abrasive disc. *Top center*, a typical rotary automatic setup of an abrasive belt conversion unit. *Top right*, removing sharp edges and surface imperfections with an electric horizontal grinder. *Center left*, twin pad sanders wet sanding the primer coat on a giant steel control panel. *Center right*, a new jet blade polishing head. The ¾ x 132-in. coated abrasive belt travels at 2800 sfpm. Endless fabric back-up belt allows the slight contouring necessary on the ball-bearing steel head. *Bottom left*, abrasive belt 12 x 126 in. polishes flat stock wet or dry in this flat finisher. *Bottom right*, deburring cams on one section of a steel camshaft for a diesel-electric locomotive. Operation involves the use of a portable disc grinder.

On this page, *top left*, grinding the routed surfaces on the back of a golf iron. *Top right*, electrically powered angle grinder, with geared motor turning at 10,800 rpm, driving a 9-in. coated abrasive disc. *Center left*, a sander for small, offhand applications. This unit may be either floor, wall, or even bench mounted. Arm is adjustable to vertical, horizontal, or any position in between. *Center right*, unusual twin-belt polisher uses opposed abrasive belts and automatic work traverse to finish the two-way taper on silver flatware, finishing both sides simultaneously, and working wet or dry.

Left bottom, many thin, flexible "leaves" of coated abrasive make this wheel well suited for polishing grooves. *Right bottom*, for deburring as shown here, light grinding, polishing or cleanup work, a portable abrasive belt unit becomes a versatile production tool. Grinding may be done on the contact wheel, on the platen or on the free-belt area between wheels.



HOST: AES
PITTSBURGH BRANCH

INTERIM MEETING REPORTER

HOTEL PENN-SHERATON
PITTSBURGH, PA.
JANUARY 12, 1957

DELEGATES TO ASSEMBLE IN PITTSBURGH FOR INTERIM MEETING

Branch Delegates and Alternates from many parts of the United States will converge upon Pittsburgh, Pennsylvania, on Saturday, January 12, when the Supreme Society of the American Electroplaters' Society convenes in Interim Meeting at 10 a.m. that day in the Pittsburgh Room of that municipality's Penn-Sheraton Hotel. Dr. Samuel Heiman, the Society's President will preside. The Pittsburgh Branch is the host Branch.

Fourth such interim meeting of the Society's highest governing council since such mid-winter assemblies were inaugurated in the administration of then-President Cleveland F. Nixon in 1951, the 1957 meeting is expected to have representatives present from nearly twenty AES Branches, including at least nine Past-Presidents of the Society. The final draft of the meeting's Agenda is presented elsewhere on this page.

The Executive Board itself will meet in the Parkview Room of that same Pittsburgh hotel on Friday, January 11 for a full-day session.

That same Friday evening, the Pittsburgh Branch will conduct a specially scheduled Branch meeting at the Gateway Plaza starting about 8 p.m. with National Officers, Delegates and Alternates cordially invited to attend. The meeting will be preceded by dinner starting at 6:30 p.m. at the same place.

At its Interim Meeting the following day, the Supreme Society—after a full forenoon consideration of the many Agenda items placed before it—will recess for luncheon then resume to late-afternoon adjournment. A cocktail party for Delegates and Alternates to be given by the Executive Board and National Headquarters will conclude the Interim Meeting. The Executive Board will reconvene the following day in the Grant Room to complete its business.

Yeoman effort has been exerted to make Interim Meeting arrangements smooth-functioning by General Chairman J. P. Coros, Reservation Chairman R. J. Goldbach, Branch President Myron Ceresa and other stalwarts of the Pittsburgh Branch. There is no substitute for experience—and the Pittsburgh Branch is the only one in the AES's long history to have hosted two successive National Conventions of the Society. It achieved this distinction in 1945 and 1946. In assuming responsibility for arrangements of this Fourth Interim Meeting, it hopes to demonstrate that its hand has not since then lost its touch.

MYRON CERESA
President, AES Pittsburgh Branch

Among other items of Interim Meeting business will be reports from the Society's National Officers, including Dr. Samuel Heiman, president; Francis T. Eddy, first vice president; Herberth E. Head, second vice president; Ralph D. Wysong, third vice president; Clyde Kelly, past president and John P. Nichols, national executive secretary. Convention reporter will, as usual, be Mrs. Florence Marquardt of Milwaukee, Wisconsin—veteran of many such AES assemblies.

FINAL AGENDA

Interim Meeting, AES Supreme Society

Penn-Sheraton Hotel, Pittsburgh
January 12, 1957

- Reports of Executive Board Members
  - Opening Remarks
  - Financial
  - Membership
  - Organic Finishing Group
- Report of Executive Secretary
- Society Publications
  - PLATING
    - Editorial Board
    - Editor
    - Advertising Manager
    - Name of Magazine
    - Payment for Papers
  - Technical Proceedings
- Society Committees
  - Educational
  - Research
  - Publications
    - Process Control Handbook
  - Structure of the Society
  - Law
  - Constitution & By-Laws Revision
  - Public Relations
    - 50th Anniversary Stamp
  - Broadening the Base of the Society's Operation
  - Branch Officers' Manual
  - Plating Courses
  - AES Scientific Award
- Inter-Society Committees
  - Order of Past Presidents
- Conventions and Expositions
  - Montreal, 1957
  - Other Conventions
  - Split Registrations
  - Convention Improvement
- Discussion From the Floor of any New Business
- Candidates for Third Vice-President

PITTSBURGH'S INTERIM MEETING ARRANGERS. Stalwarts of the Pittsburgh Branch, Host of the Fourth Interim Meeting of the AES Supreme Society. (Seated, left to right) I. H. Schram, first vice president; J. R. Crain, second vice president; W. F. Stevens, secretary; R. E. Woehrle, librarian; W. F. Pizoli, treasurer. (Standing from left) J. P. Coros, general chairman; E. J. Smith, R. H. Schindler and R. J. Goldbach, members of the Branchs' Executive Board.

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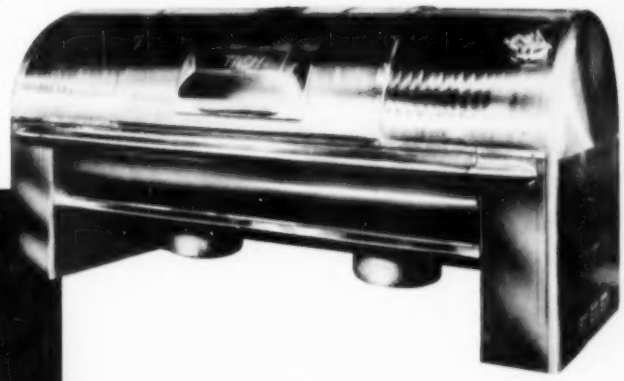

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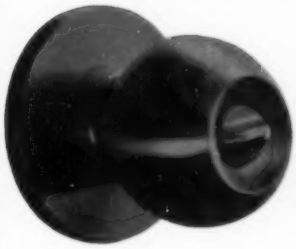

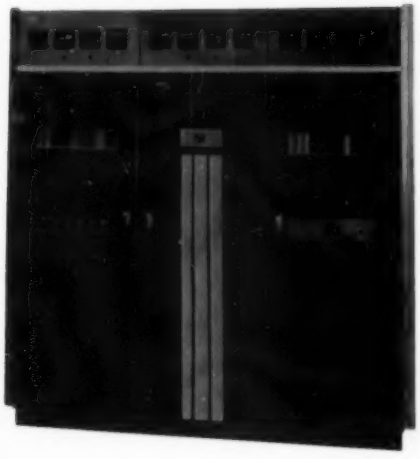

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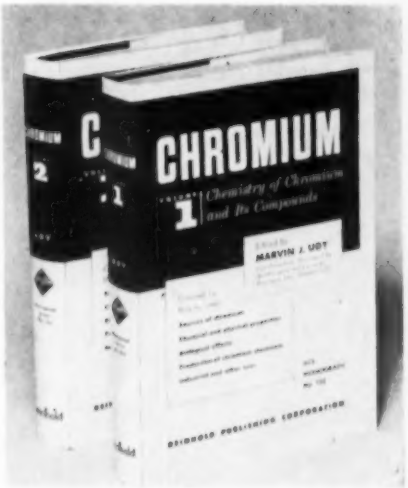

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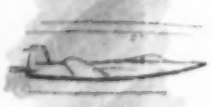

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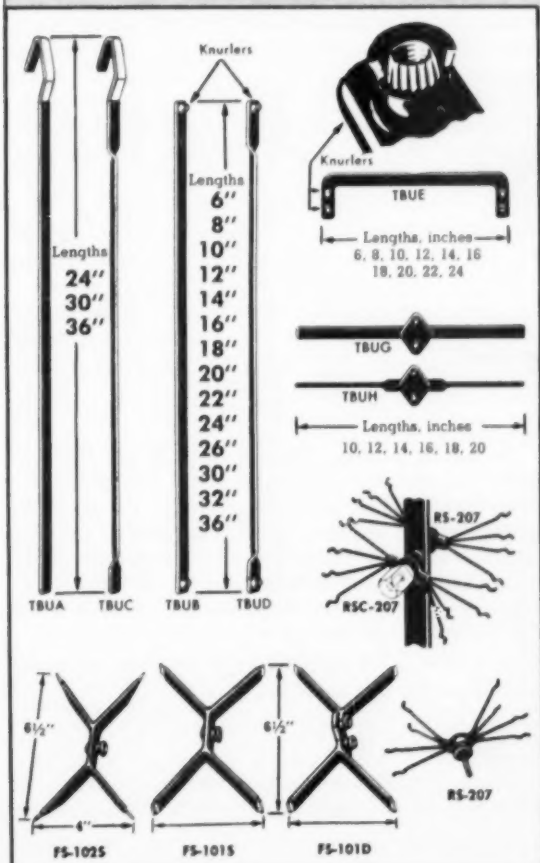

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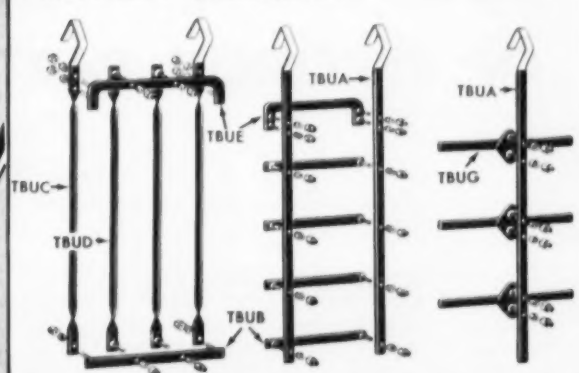

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MECHANICAL FINISHING OF PRECISION PARTS

by L. H. Hopewell*

Increased production at lower cost—without loss of quality—is an important key to industrial growth and prosperity. Great advantages in design and technology have resulted in new automatic production machines that facilitate the achieving of these goals. Each advance increases the demand for new and better automatic equipment and machinery by industry.

This, in turn, places an increased burden on those concerned with the finishing processes because finishing methods must keep pace with advances if benefits are to be realized from them. Antiquated finishing methods are inadequate, unreliable and costly. Standards of quality vary with each lot and the whole meaning of precision is lost.

By hand-processing thousands of parts, the factor of human fatigue becomes prominent. The worker may become bored, and the job loses the attention necessary to give it quality; therefore, *quantity* and *quality* are both adversely affected. Uniformity of product is difficult to obtain as large quantities seem to affect the judgment of the worker. A radius of 0.002 in. gradually grows to 0.010 in.; a 1/32 in. corner break tends to become 1/8 in.

As a result, it is not difficult to see what has given mechanical finishing its impetus.

Tumbling—or rumbling, as the process was first called—has had steady growth.

Today, there are methods to barrel finish precision gears, castings and fragile and closely dimensioned parts.

* Technical Advisor of Finishing, Fairchild Camera & Instrument Corp., Syosset, L. I., N. Y.

Greater advances are being made, but despite this progress, there are certain limitations.

The large manufacturers of barrel-finishing equipment are endeavoring to overcome these limitations by producing automated units. A submerged unit has been developed that is successfully handling the work of several large companies. This equipment is of the progressive submerged barrel type that is automatically moved from tank to tank.

Also introduced is a machine that utilizes a new type of reciprocating deburring motion. It pulls the work through the stationary media and deburring is done very rapidly, particularly on straight line parts.

At the plant of one large American watch manufacturer, thousands of tiny watch gears are being deburred successfully in a shaker. This separation is on a straight up-and-down motion. With this special purpose unit, substantial savings have been made.

The manufacturers of metal and plastic parts are trying to solve many costly finishing problems by building their own mechanical equipment to suit specific production needs.

A very knotty problem was recently solved by utilizing the pendulum motion of an ordinary paint shaker and fitting it into our production needs. A shaker was purchased and redesigned.

The can holding bracket was removed and arms were made with bushed holes.

A perforated receptacle was next made in the form of a round steel can with holes two-thirds of the way up. Four threaded lugs were welded on to hold a cover. The receptacle was welded between the above brackets and the unit was assembled.

A perforated can was made to fit inside the receptacle and a square tank was built to hold liquids for lubricating the work and media.

By building the shaker in this manner the unit could be used as a submerged shaker, or for the shaking of small parts, it could be converted to an enclosed unit.

The speeds of the shaker were varied and we were able to do work that was far beyond the range of possibility in barrel finishing.

We found that we were able to debur 2000 stainless steel grommets that had allowable tolerances of 0.0002 in. in ten minutes. This job in a barrel would normally take two to three hours and the results would not be as satisfactory.

Seven hundred aluminum fan gears were deburred completely in seven minutes. Cut-off burrs on bushings and pins were almost impossible to handle in the ordinary barrel finishing processes, but by using the shaker, with a mixture of carpet tacks and abrasives, burrs were removed in unbelievably short periods of time.

The honing action of the shaker was adapted to the mechanical finishing of camera shutter links with excellent results in this manner:

The camera shutter is an electrically driven unit of extremely high speed. The transverse links are an integral part and a considerable amount of trouble was experienced with them due to their fragile design, and the limited space in which they are confined.

Loaded fixture is then secured to the bottom of perforated basket.

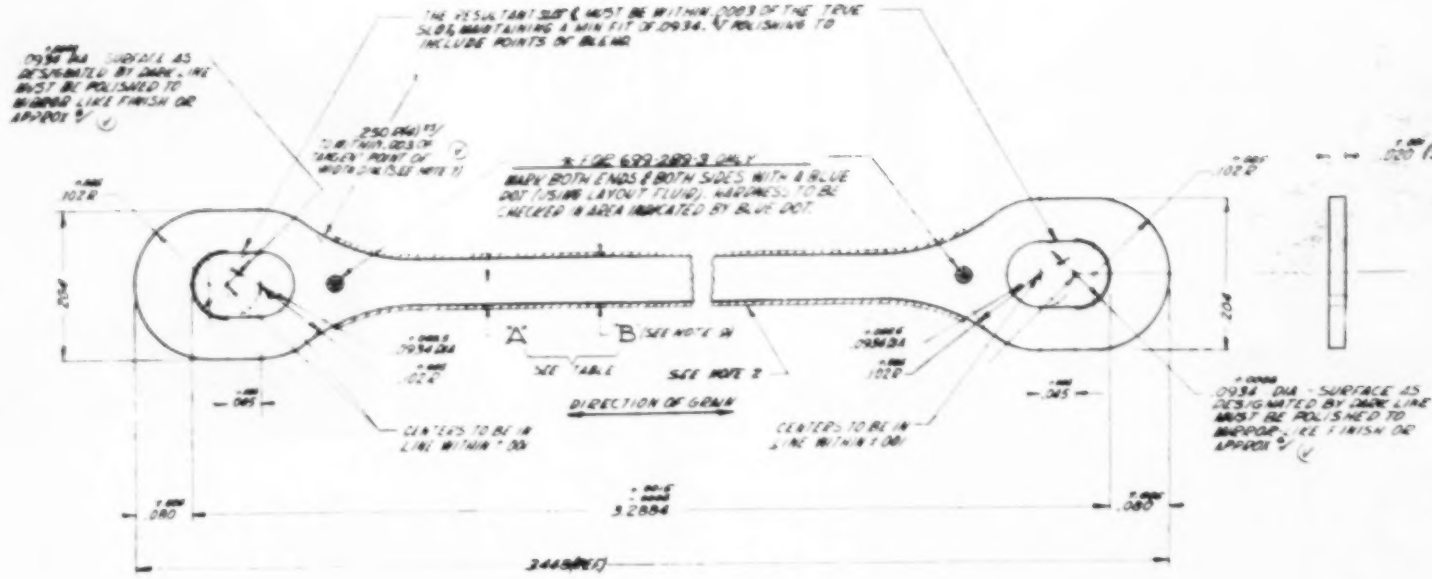
The high speeds at which the shutter operated caused the links to fracture starting from tool marks or from too sharp an edge.

It was suggested that the parts be tumbled, and, after many test runs on various types of barrel finishing equipment, it was found that the rigid dimensional requirements could not be maintained. A radius of 0.005 in. on the rail would cause too much edge break at the ends, and too much on the holes.

In the meantime, the links were being laboriously hand-finished and with a high rate of rejections. A good group of links would be made, and then for no apparent reason, another group would break under the stress and strain in actual operation. It became an issue of paramount importance to make links that would stand the rigorous inspection tests given the shutter. If a close study is made of the Fig. 1, it can readily be seen where variations in hand finishing could bring about points of weakness.

After many weeks spent in exhausting all known meth-

After the basket is placed in the shaker well, tumbling media will be added on top of the links, shaker motor is started, and the operator is free to set up the next tumbling job.



1. Slotted holes to be parallel within 0.003.
2. Blending of 0.250 R (4) to be such as to form a continuous surface around link. This blending plus straight area, indicated by shaded section, must be free from all tool marks and must be polished to a maximum of ^{10}.
3. All surfaces unless otherwise specified to be polished to ^{32} finish.
4. Break all sharp edges 0.005 maximum.
5. Break sharp corners in slots to 0.001 maximum bluntness.
6. After polishing 0.0185 minimum thickness dimension permissible at head—inside 0.102 R (typical both ends).
7. After polishing minimum 0.049 wall permissible between radius and slot (typical both ends).
8. Single continuous bow required 0.010 x .005 high.
9. Sides to be parallel within 0.001/in.

Fig. 1

ods of barrel finishing the links, it had to be determined whether the shaker was the unit to do the job. To correctly evaluate this, it was necessary to find the proper method of racking, the type and quantity of media to do the honing, and the solution that would give the quickest and best results.

An aluminum rack was made to hold twenty links and present the proper surfaces for honing. Rods were inserted in the links with metal spacers to keep them apart. The rack was placed in the bottom of the perforated can and aluminum oxide chips were placed on top of the links. The tank was then filled with a cutting oil, immersing the links and media.

The shaker was run for a short time, but the rack came to the surface of the media where little or no work could be done. As a corrective measure, two holes were drilled and tapped in the rack, with corresponding holes in the bottom of the perforated can. The rack and can were held together with two Allen screws.

A trial run was made with enough success to know that the proper course was being pursued. The holes were scored and the face of the links were etched due to the abrading action of the metal-to-metal contact of the rods and spacers. Therefore, it became necessary to immediately correct these faults before proceeding with the process.

Nylon spacers were made because they did not impregnate, and had a soft resiliency that clamped the links firmly, yet without marking the parts. This solved part of the problem but presented a new one. Pitting of the steel links developed and could not be eliminated by raising the pH value of the solution.

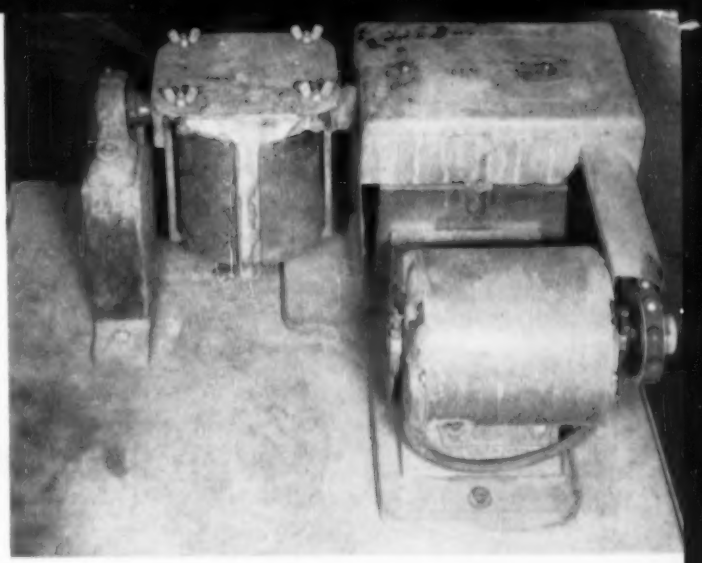
A chemical reaction was indicated as the cause. It was traced to the aluminum rack with high-carbon steel links contained within its frame, immersed in a tank that was made of brass with soldered seams, causing a galvanic cell to form from this combination of metals. The aluminum rack was then discarded for one made entirely of nylon, and the inside of the brass tank was plastic coated. A slab of zinc was placed in the bottom of the tank and the pitting problem was resolved.

The various types of tumbling media were tried, time cycles were checked and the profilometer readings were recorded. Each link was closely examined on a fifty-power microscope and finally a media was chosen that could best do the job. The cutting oil used as a lubricant in the honing process was replaced with water.

With time, media, lubricant and method established, further refinements in the process were made.

Spacers 1/16 in. thick were made to act as separators and the links were stacked 40 in the rack alternately. When the top of the rack was screwed tight, the links were held as in a vise, and the assembled rack was then securely fastened in the bottom of the perforated can and shaker.

The tank was then filled with water to a level of two inches above the links, and five inches of media was placed on top. When the shaker was started the media worked across the links in a honing action. Only one hour was necessary to remove the shear marks and give a 10 rms finish. The fixture was then reversed in the can and the other side of the links was given the same treatment. The 0.005 in. radius on the edges of the link was controlled by spacing them 1/16 in. apart, permitting only the shear marks to be honed and limiting the edge break to blueprint specifications.



This high speed shaker unit is used for deburring small parts.

By barrel finishing the links in an open end barrel after being removed from the rack, the final requirements could be obtained. The holes could be given the 0.001 in break, the ends completely deburred, and the two flat sides finished to a 25 rms finish.

The side walls of the holes had been burnished with carboloid laps to a 2 rms finish previous to the shaker operation.

Metallurgical tests proved that the links were stronger after mechanical finishing. Hand finished links could only withstand loads to 248 pounds on the tensile testing machine while the fatigue tests give readings of 110,000 cycles. The mechanically finished links withstood a tensile load of 324 pounds, and a fatigue reading of 190,000 cycles, without any sign of fracture. This performance illustrated that the impinging action of the media by work hardening the surface added strength to the part.

By barrel and mechanical finishing, low rms surfaces can be more easily obtained with accurate uniformity. This method of finishing our links has been used for a year with no shutter failures attributed to it.

L. H. Hopewell was graduated from Long Island University in 1941 with a BS degree in Chemistry. For 14 years, he has been associated with the Fairchild Camera and Instrument Corporation as Foreman of the Finishing Department. At present, he is a Technical Consultant for Fairchild and outside corporations on finishing problems. Hopewell has developed a universal technique on barrel finishing.

BARREL FINISHING

With Steel Balls and Shapes

by C. B. Schaefer and R. G. Messenger*

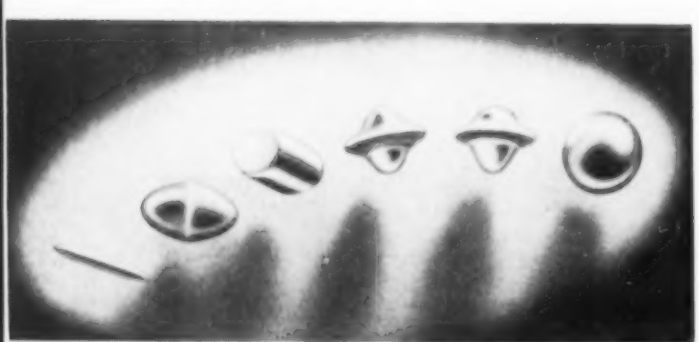
THE ELECTROPLATER IS AS CONSCIOUS of the surface appearance of the metals he works with as the top-flight photographer's model is of her complexion. In both their jobs, a smooth finish is essential.

So that plating will adhere successfully, the electroplater must be ever vigilant against surface blemishes and pores. For their removal, he is increasingly using the economical and accurate mechanical method known as barrel finishing.

Rolling metal parts in barrels to take off the rough edges and impart a polished finish dates back at least to the medieval armorers. But it was not until World War II that metal parts fabricators, in the interest of savings, were impelled to abandon manual finishing.

Since then, considerable understanding of what can be accomplished by this process has resulted, though the method is still more of a skilled craft than a science.

* Sales Manager and Member of Sales Department, respectively, Abbott Ball Company, Hartford, Connecticut.



Six shapes designed to handle virtually all burnishing needs. Left to right: pin, ovalball, diagonal, cone, ballcone, and ball. The slight flats at the poles of the ball are a characteristic of balls expressly intended for burnishing

Barrel finishing is an operation employing steel balls and shapes or abrasive materials as surface finishing media in a lined or unlined barrel. Into the barrel are put castings, stampings or other metal parts together with soaps, solvents, compounds or other chemicals and water. The metal barrel revolves, causing the finishing materials to produce a predetermined finish on the enclosed parts.

Modern barrel finishing, employing various techniques and processing materials, makes cutting down, descaling, burnishing and brightening high-precision operations. It is especially valuable in bulk-finishing die castings where the savings in the initial operation would be lost by manual finishing. Similar savings are obtained for other nonferrous and ferrous castings.

Finishing barrels are available in many sizes and shapes, the most popular being of heavy metal construction, octagonal in shape and rotated on a horizontal axis.

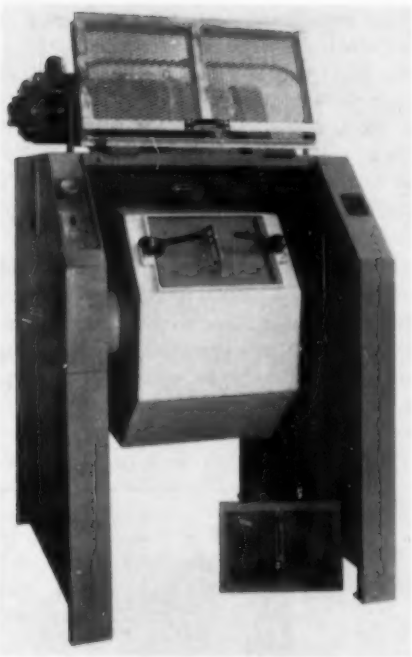
The barrel developed more than 40 years ago,† and known today as the "vertical" barrel because of its high, narrow lines, is still considered by many experts to be the design best suited for all around use. This is because it gives a greater length of "slide" and concentrates the weight of the media on the parts to be finished.

The wide "horizontal" barrel, used for long or wide parts which cannot be accommodated in the narrow unit, tends to dissipate the weight of the media and is generally less efficient. Another popular design is the submerged or "tubbing" barrel which is widely used for barrel burnishing.

To determine the best type of equipment and media for a specific finishing project, potential users should run an experimental load until all requirements as to burr removal, edge breaking, surface finish and color are satisfied.

For both the parts fabricator about to use barrel finishing for the first time and the one who is acquainted with the

† Developed by George E. Abbott.



Latest barrel is of welded steel and equipped with variable speed drive which gives range of seven to 30 rpm. Barrel capacity is 1200 pounds

process but wishes to run unfamiliar parts, prior consultation with a specialist is essential. It is here that craft knowledge continues to play a vital role. Most reputable barrel manufacturers maintain a customer service department.

Very often, a barrel finishing expert will know from past experience exactly how a specific job should be handled—the type and proportion of media to use, the necessary compounds, the barrel running time, etc. If he does not, his broad background of knowledge will enable him to determine empirically the best method in the fastest possible time.

After sample runs are made, experimental production loads should be worked. Results of these runs will determine the size of the barrel to be used, proportion of parts to media by volume, compound, time cycle and number of barrels required to handle a given lot in a regular production area.

Users desiring a multi-purpose barrel for varying jobs would be wise to select one heavy enough to insure long-time, efficient performance.

Barrel finishing is used principally for: (1) **metal removal,** (cutting down and/or deburring) accomplished with abrasives, and (2) **burnishing** or the closing up of surface porosity—with no metal removal—through the use of steel balls and/or shapes.

For deburring and cutting down, the metal parts are placed in an unlined or neoprene-lined metal barrel with water and a suitable abrasive for uniform reduction of the metal surface. To provide additional weight for speeding metal removal and insuring that the abrasive reaches all areas of the part being worked, "soft" (unhardened) steel balls and shapes may be used.

It is the ball burnishing operation, however, which is of primary concern to the electroplater. In this, the barrel is lined with rock maple or neoprene panels. Deep-hardened steel balls and shapes are the finishing media.

Ball burnishing prepares the base metal for plating by assuring a bright color and rolling down tiny surface imperfections. This roll-down action is of particular advantage in certain plated parts. The plate's pores are closed, providing greater resistance to corrosion.

Unanswered still is the effect of barrel finishing on the surface lattice habit of the basis metal and the epitaxial relationship between the coating and the basis metal. The cage-like skeletal structure formed by the various atoms of the metal is called the lattice, while the manner in which this cage is usually formed is called the lattice habit. Epitaxy refers to the structure of the basis metal reproduced in a coating.

While the action of the vertical barrel is predictable and

Battery of vertical barrels for heavy production schedules in finishing metal parts for plating. The plating department is in the background

the effect of each of the steel shapes well-known, it still takes the skilled craftsman's know-how to determine the proper proportion of balls, shapes and soaps to produce a desired result.

For a proper roll-down action in barrel burnishing, mirror-like, glass-hard finish balls and shapes are used as follows:

(1) **Balls** are used to produce finishes on large flat or gently curved surfaces. They are characterized by very slight "flats" at the poles. When conditions warrant, balls without flats are used.

(2) **Diagonals** of cylindrical form with wedge-shaped ends are used to reach corners and sharp angles.

(3) **Cones** are used for channeled or grooved parts and long joints where curved and flat surfaces meet. They also work effectively in countersunk depressions in a combination ball and wheel action.

(4) **Ballcones** combine the actions of balls and cones, eliminating the necessity of a mixture.

(5) **Ovalballs** do the work of two different size balls in one unit. In mixtures or alone, they function best where rounded forms meet short, curved joints.

(6) **Pins,** pointed at both ends, probe into sharp crevices, filligree and surface etchings. They are combined with balls and other shapes for better overall burnishing action.

Scrupulous cleanliness is essential for successful barrel finishing. This applies to the barrel, the media and the parts. To prevent scratching and poor finish, balls and shapes must be free of pits and rust and barrels and parts cleansed of all grease and foreign matter.

A soap base burnishing compound in proper proportion most often provides all the necessary lubrication for the operation, but sometimes a water softener, such as trisodium phosphate, is necessary.

For rhythmic "flow" of burnishing materials, the barrel should rotate at approximately 18 to 20 rpm for most parts. Rarely need the speed exceed 35 rpm or go below 10 rpm. Excessive rpm sets up a centrifugal force which throws the parts out of the mass of materials, decreases the burnishing operation and sometimes damages the parts.

Again, because barrel finishing is an industrial art, there are no hard and fast rules to determine the volume of balls and shapes used. The expert who advises the user can only proceed on the basis of trial and error. But, as a rule of thumb, the volume of finishing media should be roughly twice the volume of parts to be worked.

A satisfactory burnishing action can be expected only if the barrel is loaded with materials somewhere near half of its capacity. There will be a time, however, when a materials load of half barrel capacity will be insufficient. On such occasions, to keep the parts being worked from making contact, additional media should be added.

Steel balls and shapes, though they cost more initially, are actually economical because they last almost indefinitely provided proper care is given them between runs. This means immersion in a clear soap and water solution while in the barrel or storage compartment.

If unused for a long period, the media should be covered with a rust preventative which must be washed off before reusing. Slight pits can be removed by running balls and shapes in an unlined barrel filled to load level with water and five to ten pounds of fine Vienna lime. If deeply pitted, running in a fine, sharp sand mixture should precede the tumbling in lime.

Barrel finishing, if used properly, brings the metal parts fabricator the desired results, speedily and economically.

For the electroplater, barrel burnishing is a technique of proven worth. Still, it is important to remember that as many problems as possible be worked out in advance of coating the metal. The wide experience of the leading barrel and media suppliers is ready at hand for the asking.

C. B. Schaefer, who joined Abbott Ball Company in 1950 as director of sales, has a broad background of selling dating back to 1938. During World War II, he was with the sales and service department, Wright Aeronautical Corp., Wood-Ridge, N. J.

Schaefer attended Trinity College, Hartford, is a member of the National Sales Executives Club and a director of the Hartford Unit.

R. G. Messenger has been with Abbott Ball Company for two years and specializes in the sale and service of tumbling barrels and materials. Prior to his present affiliation, he sold electric motor controls for Arrow-Hart & Hegeman Electric Co. for a three-year period.

Messenger, a graduate of the University of North Carolina (1950), is a member of the AES.

Preparation for Electroplating with Coated Abrasives

by Warren K. Seward*

ELECTROPLATING OF METALS is performed to increase wear and abrasion resistance, improve corrosion resistance, and to enhance the eye appeal of the article when marketed. New and improved methods and techniques are constantly being evolved to produce a better plated surface. It is well-known that the better the surface preparation of the parts to be plated, the better the finished plating job will be from the standpoint of wear and corrosion resistance, as well as appearance. This treatment deals with the surface preparation phase of electroplating.

OFFHAND VS AUTOMATIC OPERATION

Polishing for a pre-plate finish can be accomplished with coated abrasives in their various types and forms on most metals and practically all workpiece shapes. There are primarily three methods of polishing—offhand polishing, semi-automatic, and fully-automatic machines. The method used depends principally on the shape of the product, the amount of grinding or polishing to be done, and the production volume anticipated. On low volume articles and parts, having complex shapes, it is more economical to do the polishing by offhand methods. Where the volume is sufficiently high, or where a multiplicity of parts can be adapted to the same machines and equipment, it is usually more economical to automate the setup as much as possible. In addition to minimizing the labor cost per piece, the rejection rate from handling is greatly reduced.

CONTACT WHEELS

The greatest single factor in performance, other than the belt itself, is the contact wheel over which the belt runs and against which the work is applied.

Contact wheels can be obtained in many different materials and sizes having a wide variety of hardnesses or densities—with different types of working faces. By far the most widely used and most efficient type is the rubber covered wheel with a serrated face. However, this does not exclude other types of wheels which certainly have their place in the polishing field. For example, where edge wear of the wheel is encountered, a sectional buff type of wheel usually gives the most economical operation. As the edge of the wheel wears it can be replaced by a new $\frac{1}{4}$ or $\frac{1}{2}$ in. buff section to place the wheel in new condition again. If rubber covered wheels were used, the high cost of wheel replacement would probably offset the savings in abrasive costs.

Another example might be illustrated where finish is of prime importance. On low carbon steel a 180 grit resin bond belt used on a soft, buff type wheel will produce a 25–30 microinch finish. A 240 grit resin belt is necessary when used on a 70 durometer (hard) serrated face contact wheel to produce the same finish. It is unlikely that the 240 grit belt will produce as much work as the 180 grit belt under these conditions because of the big difference in abrasive grain size—despite the more aggressive cutting ability of the 70 durometer wheel.

ROLE OF THE CONTACT WHEEL

The contact wheel performs the same function for abrasive belts that the various grades (or hardnesses) and structures do for abrasive wheels. In grinding wheels the grade and structure regulate the freedom of cut and the rate of wheel breakdown for any given type of bond. The contact wheel performs the same function for abrasive belts in that it too, regulates the freedom of cut and rate of grain breakdown. However, since there is only a very thin layer of abrasive on a belt, the economy of operation is entirely dependent upon how efficiently this relatively small quantity of abrasive is used. This is the prime reason why the proper selection of a contact wheel is so important.

Aggressiveness, as applied to contact wheels, denotes the ability of the wheel to provide a controlled breakdown of the abrasive grain, which in turn produces and maintains a free cut and fairly uniform finish throughout the life of the belt. In contrast, a wheel which is not aggressive (for a particular application) will produce a sharp and coarse finish when the belt is new. However, since there is no controlled breakdown of the grain, attritious or rubbing wear causes the abrasive to become dull and glazed with use and a progressively slower cut and finer finish results—with the belt life being substantially shorter than if an aggressive wheel had been used.

Following is a partial list of different types of contact wheels in order of increasing aggressiveness for *general* polishing operations. The order given will vary somewhat for some specific applications depending upon belt speed, workpiece material and shape, lubricant used, pressure applied, etc. . . .

Sectional buff, full disc, stitched or sewed
Sectional buff, finger type, unstitched
Sectional buff, finger type, stitched
Soft compressed fabric wheels
Soft smooth faced rubber
Medium density compressed fabric
Soft rubber, serrated face
Medium density rubber, smooth face
Hard density compressed fabric
Medium density rubber, serrated face
Hard density rubber, smooth face
Hard density rubber, serrated face

It will be noted that aggressiveness increases with hardness and a serrated face wheel is the most aggressive for any given hardness. The angle of serration, depth, number

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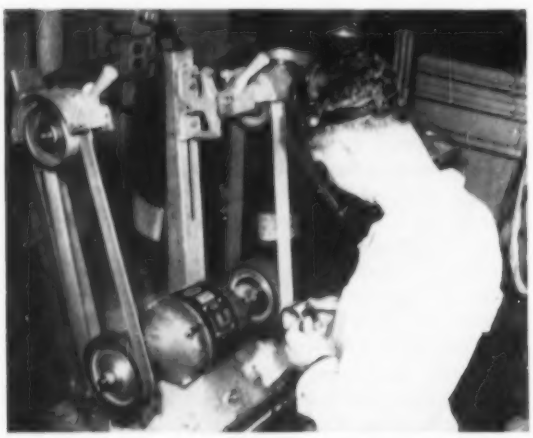
of divisions, and ratio of land width to groove width all have an effect on increasing or reducing aggressiveness. As the ratio of land width to groove width increases (i.e., the narrower the land and the wider the groove), the more aggressive the wheel becomes.

Serrating has the effect of increasing the unit pressure on the abrasive grains in contact with the work. Having lands too narrow and grooves too wide can raise the effective unit pressure so high as to cause the grain to break down too fast and cause shedding of the mineral and result in greatly reduced belt life.

Because of the many factors involved in contact wheel



Finish-polishing the O.D. of stainless steel pipe couplings. Serrated rubber contact wheel is being used.

selection and design it is not a simple matter to choose, at random, the wheel best suited for a given application. It may be necessary to test several different types and hardnesses to obtain the best wheel for the job intended. In this regard it is recommended that the abrasive manufacturer's representative be consulted in order that the number of wheels be minimized to obtain best results. Usually, the savings realized from improved abrasive performance will greatly offset the cost of the test wheels.

WORKING PRESSURES

It is an established fact that greatest productivity can be obtained from a belt by using light pressure when the belt is new and sharp, and increase the pressure as the abrasive wears and becomes dull. As an offhand operation, this is the normal tendency of the operator in order to maintain a uniform rate of cut and consequently maintain a more consistent finish. However, on an automatic setup, it is not so simple. A series of trial and error tests will soon indicate the magnitude of pressure increases and the frequency or time interval between such increases to obtain best results. The easiest way to measure the pressure is to do it indirectly and measure the power being consumed by the driving motor. The practice of using graduated pressures will pay handsome dividends by reducing the number of belts used.

BELT SPEED

For most types of metals, the normal range in polishing for a pre-plate finish with belts lies between 5000 and 8000 sfpm. For average polishing work, best results are usually obtained by using speeds of 6000–7000 sfpm for glue bond abrasives, and 7000–8000 sfpm for resin bonds.

Excellent results are obtained, when removing the parting line from aluminum die castings, by using a 180 grit to 240 grit resin bond belt running over a finger type buff wheel or smooth face, soft rubber wheel at 8000–9000 sfpm without the use of any lubrication. The grit size used depends upon the buffing sequence after polishing.

The polishing of automotive bumper bar stock in the flat produces best results when the belt speed is approximately 6000 sfpm. A higher speed shortens belt life and increases burning of the metal, while a lower speed requires a reduced rate of through feed of parts to achieve the same stock removal.

Where soft contact wheels are used to polish severe contours on the work, greatest economy usually results from a belt speed of 5000 sfpm. At this speed the belt still has a good cutting rate, but the biggest factor is that the maximum flexibility of the wheel can be utilized to obtain complete coverage of the piece with fewer passes, and consequently a shorter polishing time per piece. Also, the blending obtained is better. At higher speeds the wheel acts harder because of centrifugal force and more passes are required to obtain complete coverage.

ABRASIVE SELECTION

There are five principal types of bonds used on belts in the metal working field. They range from a straight glue bond, which produces the finest finish and has the least heat resistance, to modified resins which produce the fastest cut, coarsest finish and highest heat resistance. Since maximum heat resistance is seldom required in pre-plate polishing, the modified resin bond belts are used primarily in the coarser grits for roughing operations. Another reason why the modified resin bonds are not used for final polishing is that they are a harder and tougher bond than all others, and consequently, require higher work pressures to cause grain breakdown, which is a self-sharpening process that keeps the belt cutting freely. In this respect, the weaker bonds actually give longer belt life for most polishing operations.

The combination resin over glue bond is generally used and recommended in grit sizes 150 and finer on a J or light weight backing for average polishing applications. This bond has good strength and produces long life under the pressures used for polishing. It is obtainable in either aluminum oxide or silicon carbide for ferrous and nonferrous materials.

Aluminum oxide is usually thought of as being intended for use on materials of high tensile strength, and silicon carbide for use on low tensile materials. However, on aluminum and zinc die castings in particular, aluminum oxide will give longer life than silicon carbide—while cutting nearly as fast as the latter. When lubricants are used on these materials, the silicon carbide in grit sizes 150 and finer will produce a finer and more uniform finish which is easier to buff off. In grit sizes 50–120,

silicon carbide produces a faster cut and coarser finish than aluminum oxide, but does not last as long.

Since glue bonds are the weakest used, glue bond belts will produce the finest finish for any given grit size. On applications where light pressures are indicated, straight glue bond may produce longer belt life than the resin or resin over glue bond. The resin bonds will produce a faster cut and usually longer life together with a somewhat coarser finish for a given grit size. Where finish is of primary concern, glue bonds will give the best results with some sacrifice in life. For good life with reasonable finish, the resin and resin over glue bonds are tough to beat.

The final polishing operation on steel and stainless is often done with silicon carbide and lubricants. This applies to offhand operations as well as to flat polishing and automatics. On stainless, the silicon carbide produces a much finer finish using a coarser grit size while leaving a light bluish cast which has general eye appeal. A typical sequence is 120 and 180 grit aluminum oxide, followed by 150 to 180 grit silicon carbide. On steel, the silicon carbide produces a finer and smoother finish which is easier to buff out. In many cases, the silicon carbide replaces the need for a buffing operation. The bluish cast is generally not found on steel. A typical sequence for use on steel is—80 and 150 grit aluminum oxide followed by 180 grit silicon carbide, or 150 aluminum oxide followed by 180 silicon carbide, depending upon the condition of the steel.

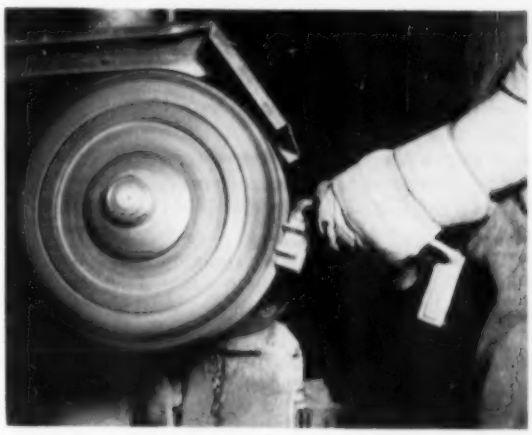
On brass, copper and materials that tend to be stringy, silicon carbide is used exclusively. The use of a lubricant is also a necessity.

When it is necessary to use coarse grits for roughing operations, X weight belts should be used if possible. The heavier backing gives a faster cut and longer life than a J weight belt of the same grit size and bond type. Another point that can be a dollar saver is the degree of flexing that a belt receives. Use a belt having the least amount of flexing that will do the job. The more flexible a belt is made, the less production will be obtained from it. Where flat work is being polished, the use of paper back belts will do a satisfactory job, in many cases at a cost substantially below that of cloth back belts.

HANDLING AND STORAGE OF COATED ABRASIVES

Best results are obtained from coated abrasives under storage and *use* conditions of 60°–70° F and 40–50 per cent RH. However, the only way to maintain these conditions of temperature and humidity is to have the polishing room completely air conditioned. Since this is seldom practical, the next best thing to do to obtain maximum efficiency is to store the abrasives in conditioned rooms or cabinets. Storage cabinets are perhaps the most convenient and practical means; and they should be located in the polishing room within easy access of the operator or machines on which they will be used. They should be removed from the cabinet and immediately placed on the machine for use. This procedure will insure maximum benefit from your abrasive dollar. The productive difference between coated abrasives having too high or too low a moisture content as compared to one having optimum moisture content can be as much as 30%. For most polishing operations using glue or non-waterproof resin bonds, a low relative humidity, and consequently a lower moisture content has a less detrimental effect on coated abrasives than does a high relative humidity.

A relatively simple and inexpensive storage cabinet can be made which will handle the majority of conditions encountered. The cabinet should be air tight. Other essential features are: a source of heat, such as ordinary



Rough-polishing a bronze casting, using 80 grit X-weight resin bond belts over a medium soft compressed canvas contact wheel. Parts are finish-polished with 180 J-weight belts to achieve a good blend prior to buffing.

light bulbs; a source of moisture, such as a shallow pan of water which can be covered when necessary; and a small electric fan to provide air circulation. It is, of course, necessary to have a thermometer and psychrometer or hygrometer attached to the cabinet interior to indicate conditions inside the cabinet. The heat and moisture sources should be located in the bottom of the cabinet and the fan in the top. By regulating the heat and moisture in the cabinet, optimum conditions can be easily maintained and maximum abrasive efficiency realized.

Perhaps the easiest way to reduce abrasive life is to scuff one abrasive surface against another. This quickly dulls the abrasive and shortens its useful life.

LUBRICANTS

There are many types of lubricants for use on belts. The most common forms of lubricants are oil and grease sticks. The proper oil for a given application will invariably give better performance than any other type of lubricant. For a starting recommendation, it is suggested that the same type of oil be used on the belts as is used on the metal when that material is machined on machine tools, such as lathes, milling machines, etc. However, since there are so many types of oils that perform differently under different conditions, it is strongly recom-

Simple and inexpensive method of using oil to lubricate abrasive belts "automatically." It works best on glue bond belts because the oil penetrates the backing easier.

mended that several types or brands be tried. The added effort can be very rewarding performance-wise.

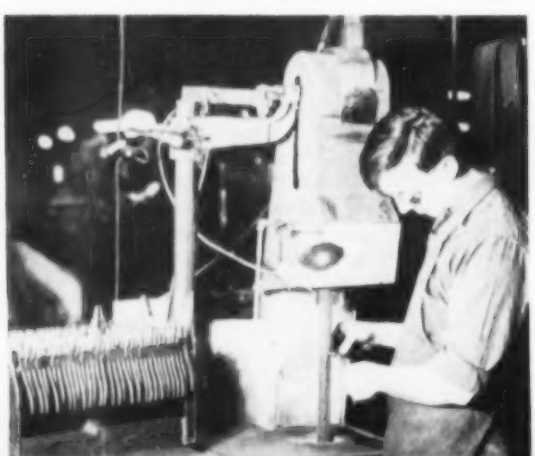
One thing that appears to be common to most oils which work well on belts is a higher percentage of wetting agents. This permits the oil to get into and remain in closer contact with the belt and work than similar oils without wetting agents.

There are two easy ways to apply oil to a belt. The first is to drip the oil on the back side of the belt—about 3 to 4 inches ahead of the idler wheel. The idler then squeezes the oil through the backing to lubricate the grain from the back side. With this method it is vital that the oil have wetting agents in them since the cloth backing is filled with glue, resins and inert fillers which impede the penetration of the oil. It may be necessary to add additional wetting agents, in which case they can usually be obtained from the oil supplier or a chemical supply house.

The second method is to spray the oil on in the form of a fine mist. This can be done in many ways, from a setup such as a foot control actuated by the operator, to a completely automatic lubricator. In either case, the quantity of oil used need not be excessive. For a belt size of 4 x 132 in., average oil consumption should not be more than one gallon per 40-hour week.

Grease sticks for use on belts should have a lower melting point than greases used on grinding or setup wheels. In one case where a hand tool manufacturer converted from setup wheels to abrasive belts, he decided to use up his supply of setup wheel grease on the belts. On the first five belts used, he averaged 42 pairs of slip joint plier halves per belt. He then obtained some belt grease stick and immediately the production per belt jumped to over 500. As his operators gained experience with belts, he obtained in excess of 1000 pairs per belt. Experimenting with oil lubricants, he now gets over 1600 pairs per belt. It pays to investigate lubricants!

Rough-polishing round points of forged wire pliers on the slack of the belt, using 80 grit resin bond belts. This is followed by 180 grit with grease lubricant before plating.



SOME OPERATING TECHNIQUES

It is often possible to achieve greatest production per belt by using two contact wheels. For example, a new belt is used on a smooth face contact wheel until it begins to lose its cut. It is then used on a serrated face contact wheel to wear it out completely. In many cases, the production from the serrated wheel exceeds the production from the smooth wheel by 3, 4, and even 5 times.

Another way to reduce costs by using two wheels is to use the hardest wheel possible that will do the job for the roughing operations, and then use a softer wheel to do the finishing and blending.

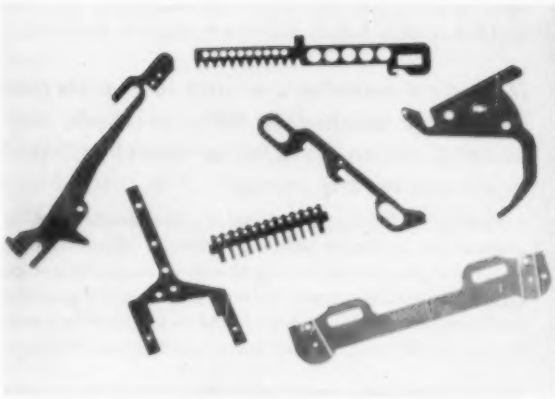
Where soft, buff type contact wheels are used for contour polishing it is imperative that the backstand idler be mounted on the floor. Otherwise, tracking difficulties result. With the idler on the floor, the belt has 90–110° of undisturbed wrap around the wheel before it contacts the work. Without this amount of wrap the wheel deforms under pressure and causes the belt to "walk" sideways away from the work. In extreme cases it will even throw the belt completely off the wheel.

Also, when using a narrow wheel of this type it is easiest to get the machine running without throwing the belt off, by using very light belt tension until the wheel comes up to speed. Then increase the belt tension sufficiently to prevent the belt "walking" under pressure.

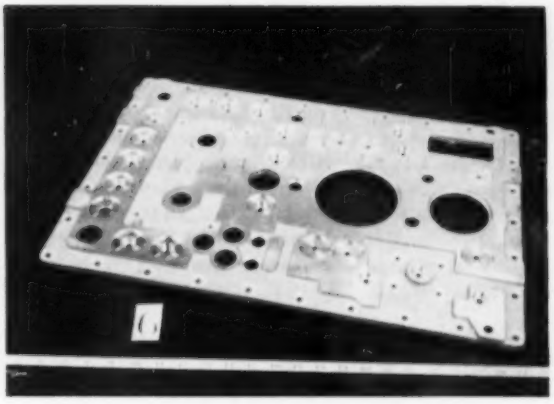
It is usually more economical to provide adequate protection for the finish polished parts against handling marks and digs than it is to repolish the damaged areas. It costs money to produce a good finish. Protect your investment!

Abrasive belts are well-established as economical tools for grinding and polishing various materials in preparation for electroplating. The methods and practices presented here are intended as guides when considering the ultimate goal of every industry—the reduction of costs to the minimum.

Warren K. Seward was born in Luzerne, Pennsylvania in 1924. He studied Pre-Engineering at Dartmouth College and Mechanical Engineering at the Illinois Institute of Technology. He received his BS degree in Mechanical Engineering from Case Institute of Technology, Cleveland. Mr. Seward joined The Carborundum Company, Niagara Falls, in 1948 and is now that firm's Supervising Engineer of New Market and Application Development, The Coated Abrasives Division. He resides in Niagara Falls with his wife and three children.



Intricate parts, such as the business machine components shown here, can be barrel finished by the hundreds under proper conditions without danger of impingement or damage to critical radii.



Larger pieces, such as this 6 lb aluminum casting used in photographic equipment, are deburred and finished in about one-tenth of previous time using a bench operation.

The Role of Modern

BARREL FINISHING

an exclusive interview with

C. J. Glasrud*

Mr. Glasrud, you've been working with barrel finishing systems for several years and have had a hand in evolving some of the most modern methods being used today. Is there any simple definition for barrel finishing?

Basically, barrel finishing involves the removal of metal from a work piece or part by random abrasive action—whether it's with loose mineral grain, abrasive chips, or the attrition of the parts on each other.

It's a random stock removal process?

Yes, but don't let the word "random" throw you. Barrel finishing when properly done is a precise, exacting operation and at all times under the control of the operator. In this case "random" means that overall stock removal or polishing is taking place—not simply on one surface, but on all surfaces of the work piece. The amount or degree of removal, as I mentioned, is carefully controlled.

Surely barrel finishing isn't limited to stock removal. Haven't there been some . . .

Absolutely not! Barrel finishing is applicable to many finishing operations—descaling or degreasing, generating radii, coloring, polishing and deburring—to mention some of the more common ones. If degreasing, for example, is to precede deburring, it frequently cuts handling costs to do both operations in the barrel.

What are some of these parts or work pieces you mentioned?

Well, you hit a pretty broad subject. They can be parts with bearing or wear surfaces, or complete products being finished for plating. Just about anything that can be put into a barrel stands a chance of being barrel finished. Where the parts are small and simple (maybe 2000 to a barrel) the chances are very high that the parts can be

* Technical Supervisor, "Honite" Division, Minnesota Mining and Manufacturing Co., St. Paul, Minn.

done. If the parts are large (maybe one to a barrel) or have many inside surfaces and holes, the opportunity for barrel finishing depends on the finish specifications. Shaped media have helped greatly in getting into recesses of these complex forgings and castings. Sometimes combinations of methods are possible—that is, where complex parts may require 1 to 2 hours to deburr by hand, the barrel can often do about 80 per cent of the deburring and thus cut the expensive hand work to about 20 per cent of the total. Most metals can be barrel finished, you understand, including steel, aluminum, magnesium and an ever-widening range of alloys.

You mentioned castings—does this include all types?

Pretty much. We know that barrel finishing is successful with die and sand castings, and we've got a lot of field work going on all of the other types. But castings were just an example. The bulk of precision barrel finishing involves deburring, improvement of mechanical or ground surfaces, and generation of extremely smooth surfaces for final finishes or for decorative plating.

What about shapes, Mr. Glasrud. I mean, does the part have to have all flat surfaces or can it be contoured?

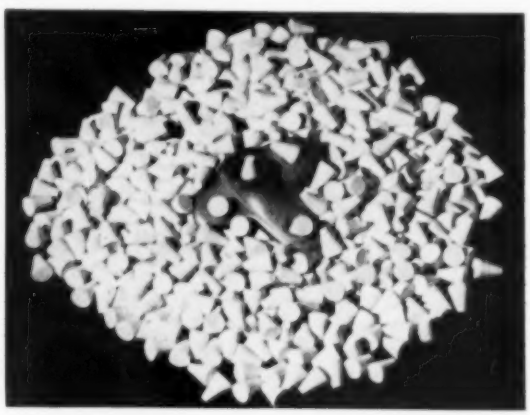
We've found the best shape for barrel finishing is a gradual curve or a gently rounded surface—at least that's the easiest shape to finish. But if they were all like that our laboratory people would be out of work. Oddly enough, the parts that often require the most barrel finishing technique are those with dead-flat surfaces. Parts with deep recesses or those on which we have to hold a sharp corner are also more difficult—but by no means impossible. Compared to doing these pieces singly, by hand, barrel finishing is a real help.

I was just going to ask why barrel finishing is such a good investment, but you started to answer that when you compared it to hand operations.

Then let's pick it up from there. The biggest single factor in favor of barrel finishing is cost savings, and these are being realized in many ways. Primarily, of course, it's the switch from individual hand finishing operations to mass finishing of up to thousands of parts in a single barrel. But even within that broad framework of savings, others are possible—such as better finishes on parts having parts not easily handled by belts or buffs—which result in less costly plating procedures or the creation of more uniform finishes; or the generation of wear surfaces so fine that multiple machine grinding for low micro-inch surfaces is unnecessary. Then, too, many plants find that personnel who have been trained in hand polishing can easily be switched to other plant operations, and the burden of training new personnel is often avoided. One of the reasons barrel finishing is gaining momentum so rapidly is that personnel of any kind—trained or otherwise—is hard come by, and the mass finishing potential of this method is helping to break production bottlenecks.

If I were a manufacturer with some parts that were being finished by other methods, how would I determine whether barrel finishing would save me any money?

First of all I'd suggest you send some sample parts to a distributor of barrel finishing supplies. Many of these men have job shops or testing barrels in conjunction with their distribution setup. Such a test would determine two things for a given part: first, whether it could be barrel finished at all; and, second, which combination of equipment, materials and methods offer the most economical production operation, in the least amount of time.



Shaped ceramic media simplify the barrel finishing of many parts. Illustration shows how the various surfaces of "Ceramicones" expose themselves to the contours of a work piece.

I suppose the amount of time determines finishing costs?

Yes, it does have an effect on them, but there are other factors to consider. The types and amounts of compounds and abrasive chips, the number of operations, separation procedure and handling techniques all contribute toward cost. Once a barrel finishing system is set up, and the operator develops finishing and handling techniques, it's possible to reduce the cost of a given operation again and again. As in most other fields involving labor, it's the time the operator spends *handling* parts that adds cost to the operation.

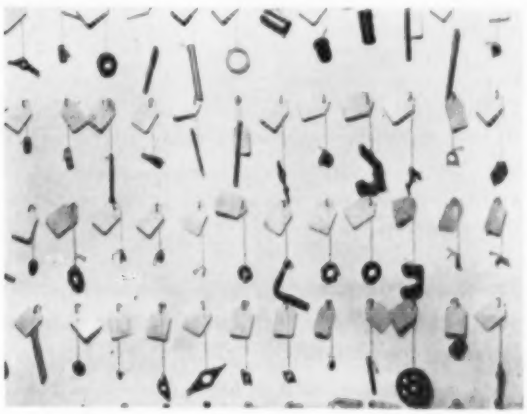
What does it take to start a barrel finishing installation?

There are actually five basic elements. First, of course, you have to have parts that can be barrel finished. I'm not trying to be funny about being so basic—but without the parts there's no need for a barrel finishing system. Then, you need abrasive media (the chips), barrel

finishing compound (that's the powdered material), water (an important part of the operation), and, naturally, a barrel.

That seems like a lot of data and equipment to compile for someone who doesn't know too much about it.

That's exactly why manufacturers of barrel finishing equipment and supplies are willing to furnish the advice, counsel and continued interest of experienced field engineers. These men can, in most cases, make a plant survey, suggest what parts might be barrel finished, and recommend the selection of equipment and materials.



This is a "parts board" in the office of a distributor of barrel finishing equipment and supplies. The distributor also operates a job shop, in which these and thousands of similar parts have been successfully barrel finished. Tag on each part refers to a file card bearing barrel finishing formula.

What about selection . . .

Let me put in just one more comment here about the field engineer. After the equipment and supplies he's suggested are ordered, his job really starts. Then it's up to him to set up the system, and get it functioning smoothly, and keep the operator informed of new developments and techniques.

What about selection of abrasive chips?

There's quite a history to barrel finishing media, and I don't think we need to go into it here, suffice it to say that a great variety has been tried—metal stars, tacks, glazier's points and others, some of which are still being used in very specific instances today. Later on the swing went to natural abrasive stones, granite and limestone, which are widely used with excellent results. More recently, manufactured abrasives have expanded the use of barrel finishing in the field of precision finishes.

What's the background on these newer chips?

Well, during World War II aluminum oxide and aluminum oxide-impregnated materials were introduced in the aircraft industry where low tolerances and high finishes were the rule. These are fast-cutting chips. Aluminum oxide by itself has the disadvantage, however, of wearing rather rapidly—and the amount of cost advantage you can show with it depends largely on the type of accounting system you use. If the system stresses materials cost, the regular aluminum oxide looks bad. To offset this, a synthetic chip was developed by adding a silicate to the aluminum oxide, and then firing to complete vitrification. The result is a tough, fast-cutting, long-wearing chip. Still more recently, shaped tumbling media have been introduced and is receiving considerable attention.

Why the special shapes?

Uniform shapes and precise sizing eliminate lodging when the design of the part is such that stones might stick in holes or recesses. If you're buying a manufactured shape, its long-wearing qualities are important to retain the original shape and size. An example is the conical ceramic media recently developed by research. But shaped media also include metallic material—zinc, steel slugs and shot. Steel balls have proved to be excellent for achieving a high polish on steel parts, but for general use they are at a disadvantage because of cost, storage difficulties and weight. Ceramic shapes are light, and offer freedom from rust and pitting.

What do compounds contribute to barrel finishing?

More and more, compounds are expected to do special work such as grease and scale removal, and rust inhibition. Cleansing parts is important because we find that nearly half of all barrel finishing difficulties are due to dirty—burred, scaly or greasy—parts. This dirt retards and in some instances cancels out the action of the abrasive chip. As an example of the retarding effect of "dirt," we have found in our laboratory that if a set of parts is run five hours, then rinsed, and the compound renewed and the set is run for another five hours, the rate of cut is twice what it is for a single run of 10 hours. Compound can sometimes be used over again, as with submerged units, but watch out that you're not using the dirt over again, too!

Is it possible to degrease or descale parts while they are being finished?

Definitely. That's one of the things we mean by "technique"—knowing when and how much of a given compound to use.

Any other kinds of compounds?

Well, we've mentioned cleaning and rust inhibiting compounds. For some types of work there are abrasive compounds in which the abrasive ranges in size from 30 mesh to 600 mesh. These include aluminum oxide, which is the most effective but somewhat dirty and requires

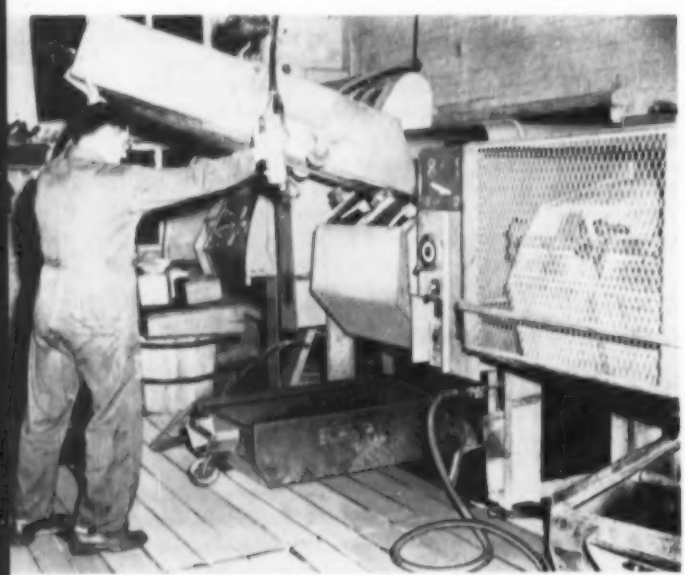
thorough subsequent parts washing. Quartz is clean, but is most effective when the cutting requirements are not too great. Where the amount of required abrasion doesn't demand more, I personally favor the quartz type. Silicon carbide is fast cutting, but sometimes has a tendency to build up pressures within the barrel. Coloring compounds are mildly abrasive and are intended, as their name implies, for generating a bright finish, particularly on zinc.

Well sir, we've talked about parts, chips and compounds: Now, do you have anything to say about the equipment itself—the barrels and accessories?

With constant research and development programs being carried out by leading suppliers of equipment, the barrel picture is getting wider almost by the day. The type of barrel to choose for a given installation depends on a lot of things, including how much room the user will allow for barrel finishing equipment, and the average size of the parts. The standard barrel, I guess you could say, is octagonal with a rubber lining to prevent parts damage against the steel sides. The barrels can have one, two or three compartments, and the size of the barrel, naturally enough, determines the size of the motor. I'll give you a chart on barrel sizes to give you some idea of the proportions.

I gather there are other shapes besides octagonal?

Yes, there are open-end, conical barrels, round barrels—and some, called jar mills, that even look like barrels or kegs. Recent advances have brought submerged units into use, and in many cases large parts may be fixtured in specially designed barrels to protect the parts and concentrate abrasive action in selected areas.



A factory modern barrel finishing department usually features hoist pans for easy loading. Note handy hoist controls.

What else is available in the equipment line?

Chip bins for media storage are a desirable investment for large users of media; hoist pans to fill the barrels with chips and parts make the work a lot easier; and either a vibrating or magnetic separator to separate chips and parts after finishing is almost a must.

BARREL SPECIFICATIONS

Total Capacity	Height Inches	Length Inches	Number of Compartments	Motor HP
13 Cubic Feet	30	32	1, 2	1½, 2, 3
23 Cubic Feet	30	48	1, 2, 3	3
29 Cubic Feet	36	48	1, 2, 3	5
37 Cubic Feet	36	60	1, 2, 3	5

There was one other factor you mentioned; oh yes, water. Where does water fit into a barrel finishing operation?

It's about as important to barrel finishing as it is to the plasterer or mason. It's the water in the barrel with the chips, parts and compounds that unifies the mass, and causes it to slide freely and smoothly. Water level is a variable—and vital—factor in successful barrel finishing. The hardness of water can affect the color of the finish. Insoluble soaps formed from hard water ions give a haze to a metal surface. This hardness can be balanced by use of proper compounds. Don't be too quick to put responsibility for finishing troubles on hard water, however, since several other factors are more important.

There seems to be an almost endless number of variables in the process. Doesn't this complicate the procedure? How do you maintain consistency from batch to batch?

It's the number of variables that makes barrel finishing as valuable as it is to industry. Because of the variables, and extensive testing and product development, almost any part that can be put in a barrel can be barrel finished successfully, providing you have the right combination of compound, chips, water, barrel speeds and time. I know I just threw in a couple of factors we haven't discussed—speed and time—but we'll get to those in a minute. The real key to a productive and cost-saving barrel finishing system is record keeping. Every time a batch of parts is run, all the necessary data should be carefully recorded and filed. Then, next time the same type of parts come along a simple check of the files will indicate the right

Barrel finishing room of a modern distributor-job shop operation. In addition to handling production runs, this equipment is also used for the test finishing of parts for prospective customers. Barrels at left and at right is a line of chip bins. Each barrel has its own drainage and water supply.

barrel finishing formula. Another advantage is that you'll have a starting point for running tests on similar parts.

You recommend trial runs, then?

By all means. A trial run is essential for new types of parts. The process is simple enough—and often will be handled by the barrel finishing field engineer the first time through.

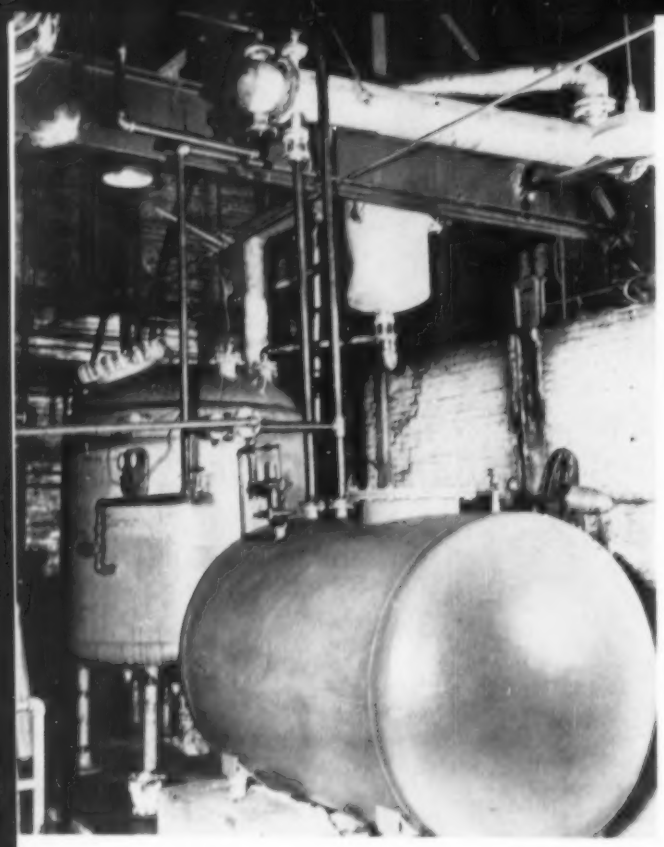
Let's go back to speed and time.

Barrel speeds vary from four to 32 rpm—not fast when you compare them to normal spindle speeds used in other methods of finishing. The best speed is generally the fastest speed at which the parts can be run without damage from impingement in the barrel. After the speed is determined, the parts are run, with periodic checks, until the desired finish is obtained. That point indicates the length of run.

There seems to be some discussion between barrel finishers about whether the system is a science or an art. What's your opinion, Mr. Glasrud?

We prefer to think of it as a science. True enough, I think when it first got started it was played by ear more than anything, but modern technological developments and record keeping have removed a lot of the guesswork—and moved it over into the scientific bracket. We've still got a lot to learn; but we've learned a lot, too, and barrel finishing has definitely established itself as an economical, high quality mass finishing method.

As technical supervisor of the 3M company's "Honite" division, the responsibilities of **C. J. Glasrud** include quality control, improvement and development of new types of chips and compounds. The 35-year-old Glasrud has been with the 3M company nine years, prior to which he served as a naval electronics officer and worked in General Motors research laboratories. He is a graduate of the University of Minnesota.



An acid recovery system installation shown with condensate receiver in foreground. Vessel standing upright is the still. Thin horizontal vessel at top is the condenser, while the separator is seen below and partly behind the beam

STOP CHROME WASTE, POLLUTION AND HEAT LOSS

by E. W. Neben*

THE LATEST SESSION of Congress has witnessed stormy debates on water pollution control which are of interest to the metal plating industry. A measure to extend and strengthen Federal control rallied strong support. The new bill would add $1 billion to the enforcement program, increasing pressure already on those industries with waste disposal problems. Chrome platers are a group that have problems of both water pollution and wasted raw materials and energy.

Seldom is an entire industry found with a primary operation that is basically inefficient. Yet, the chrome plating industry fits that description too well, as every plater knows. Most commercial platers deposit only about 15 per cent of their chrome consumed on the plated part and in doing so, the plating process uses five to six times the theoretical requirement of electrical energy. The unused chrome is lost to the rinse tank and the unused power is wasted as heat. This doesn't mean chrome platers themselves are inefficient. On the contrary, a great deal of skill is required to keep these highly technical plants operating at optimum levels, producing quality chrome plate. What it does mean is that the chemistry of the operation has been working against the plater. Employment of a novel means of using waste electrical power to prevent loss of chromium may revolutionize the economic factors of plating operations. A leading manufacturer of chromic acid recovery units† has announced the development of a unique application of its well-tested plating solution recovery system.

Basically, the new method of operation combines the principles of plating bath temperature control with the elimination of pollution from rinse waters. Heat from the plating solution that was formerly wasted is used to evaporate water in an acid recovery system.

The feat is accomplished by using high vacuum evaporation to remove excessive heat in a flash cooler. As the solution enters the flash chamber, a fraction of the water will flash into vapor lowering the temperature of the remaining liquid. Latent heat of vaporization is released, and this heat, in turn, is used to evaporate rinse water in the recovery system.

Because there is a loss of water volume from the plating solution when the flash vaporization takes place, an equal

*Engineering Dept., The Pfaudler Co., Rochester, N. Y.
†The Pfaudler Co., Rochester, N. Y.

volume is added to the plating tank from the first or most concentrated rinse. Inventor of the process, Walter F. Swanton, project engineer at the manufacturing firm, indicates that the cycle for this phase of the operation is complete when recovered condensate is fed to the second or third rinse tank. A patent is pending covering this method of operation and will be assigned to the manufacturer when it is received.

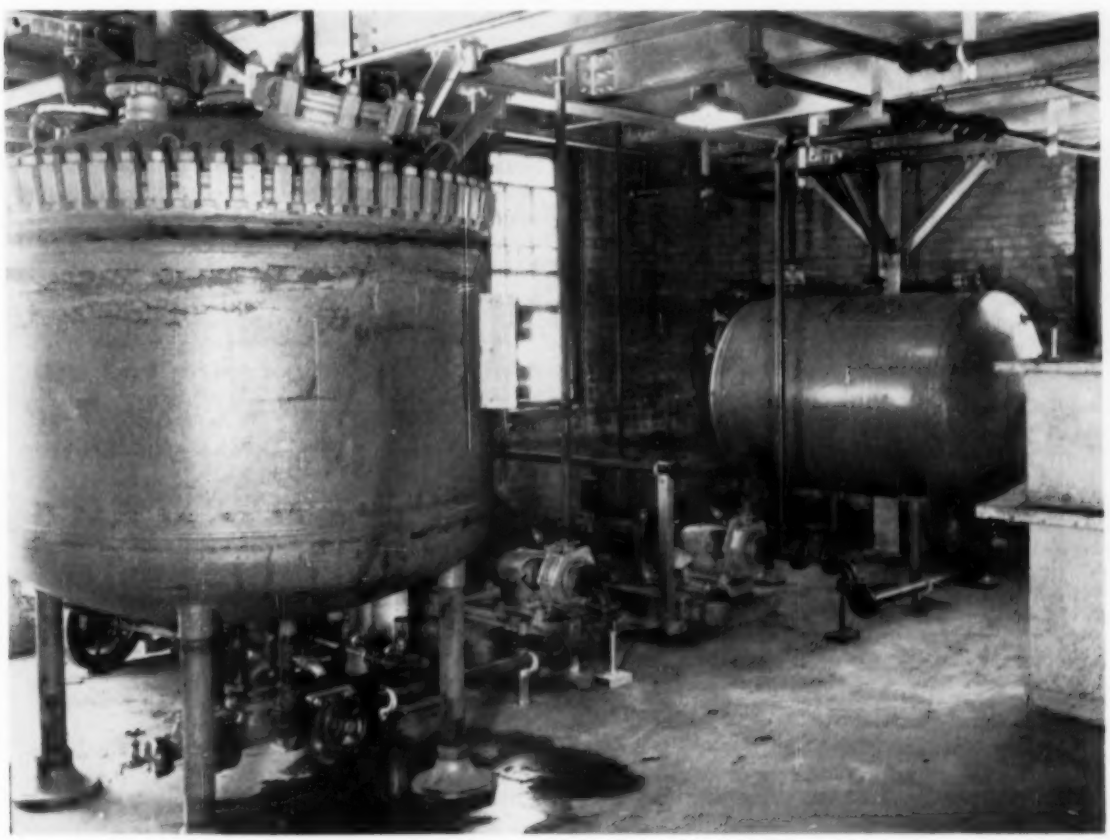
Designers of the system feel that it offers considerable economies to industry not otherwise available. Two big advantages are that it makes possible the elimination of large steam generation facilities and more precise control of the temperature of the plating bath.

Application of the system depends upon the temperature of the plating bath and available cooling water temperature. Studies now in progress indicate that this type of operation will have its greatest application where the temperature difference between plating bath and cooling water is 30° F or higher. The larger this difference is, the more economical the operation of the combination temperature control and reconcentration system.

Announcement of this method of eliminating wastage and pollution by chromic acid occurs at a time when the operator of a plating line is being severely pressed by public opinion and state and Federal regulations for pollution abatement. Federal control laws created in 1948 made pollution of streams by industrial waste a responsibility of the national government. The outlook after present legislation is reworked and settled, is that it is going to be tougher for the plater in the future.

When the pressure from anti-pollution groups gets too strong, the company is faced with two alternatives: either recover and reuse "waste," or destroy wastes chemically. The latter method adds to the plater's losses. Recovering wastes and reconcentrating the lost plating solution saves most of the acid that was going down the sewer, and eliminates pollution at the same time.

A plating solution recovery system accomplishes both requirements: it removes the problem of waste disposal and stops the loss of valuable raw materials. Many companies are now using the system for these reasons. The system is the second half of the combination of temperature control and reconcentration system mentioned earlier. Some platers have been able to achieve a net savings of



Partial view of another installation of a plating solution recovery system showing glass-lined still in foreground, receiving tank in background

approximately $2000 per month, enough to eventually pay for the system in a few months. Recovery systems installed have been known to recover approximately 80 per cent of the chrome being consumed by the platers. This chrome was put back to work, reducing raw material costs.

OPERATION OF THE SYSTEM

Here's how the plating solution recovery system works. The process of concentration by evaporation is the basis of the entire operation. When a plated part is lifted from the plating tank and put into the first rinse tank, it carries acid over with it which contaminates the wash water. Instead of dumping this contaminated water out, it is intercepted by the recovery system and put in the still where it is boiled. Boiling reconcentrates the acid to plating strength, which is returned to the plating tank. The water which is boiled off is recovered by condensation and returned to the wash system, or as de-ionized water make up.

In many plants rinse tanks are operated on a continuous overflow basis. Generally, the flowing rinse is preceded with a still rinse. Effluent concentration usually ranges from 5 to 30 ounces of chromic acid per gallon of water. Users of the recovery system allow the concentration to build up in the first rinse tank. This reduces the cost of evaporation. Of course, much greater economies can be gained if excess heat from the plating solution is used to evaporate this contaminated rinse water. Economical operation of chromic acid rinse tanks can be obtained at a point below a buildup level which could impair the quality of the finished chrome. The desired buildup generally occurs in eight to ten hours. Then, the wash water is transferred to a glassed steel still where the acid is reconcentrated to plating strength.

The highly efficient recovery systems available are applicable to recovery of a number of acid solutions including sulfuric and chromic, some metal cleaners, nickel and nickel salts, copper, gold and silver. Low temperature operation also permits handling of hard chrome plating baths containing fluoride additives. The system is adaptable to batch operations, semi-continuous systems, or a fully continuous, fully automatic operation, depending upon general plant operations and concentrating duty required. Batch operations are generally preferred where there is one eight hour shift per day.

Materials used to construct various parts of the system are important since many hot concentrated plating solutions can be extremely corrosive and wash water must not pick up iron contamination, if it is to be reused. Iron-free wash water assures the highest work quality. Acid-resistant glassed steel has been found to be the only practical fabrication material that will resist the corrosive attack of these acids, such as 25 to 45 per cent chromic acid solution. Hence, the still is glass lined for its corrosion resistance. The concentrated acid receiver is also of glassed steel, in this case to maintain high purity. In other parts of the system, stainless steel is adequate to prevent iron pickup.

Adaptations of the system have been made to meet the needs of specific plating problems. When chrome plating is applied for wear-resistance duty, as on airplane engine parts, the process differs slightly from one where the plate is purely decorative. In these heavier duty processes, plating the same basic metal, the rate of contamination is greater than the rate of contaminant reduction due to drag out. For this reason all or part of the batch is purged periodically. Sometimes these drag-out drippings are recovered in drip pans. In this case, the contamina-

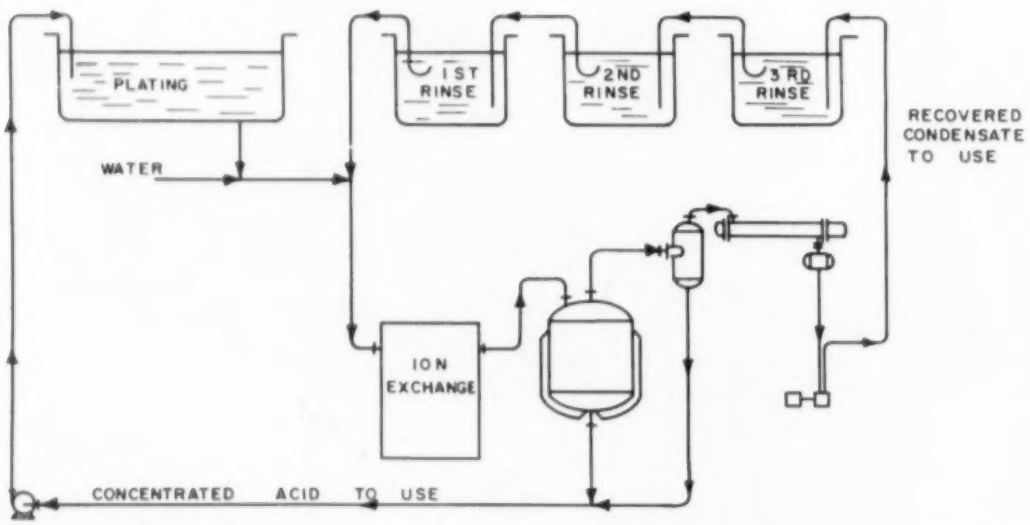


Fig. 1.—Flow chart showing complete plating plant operations including plating, ion-exchange and recovery systems, with overflow tanks. The unmarked vessels to the right of the ion-exchange and below the rinse tanks represent the acid recovery system detailed in Fig. 2

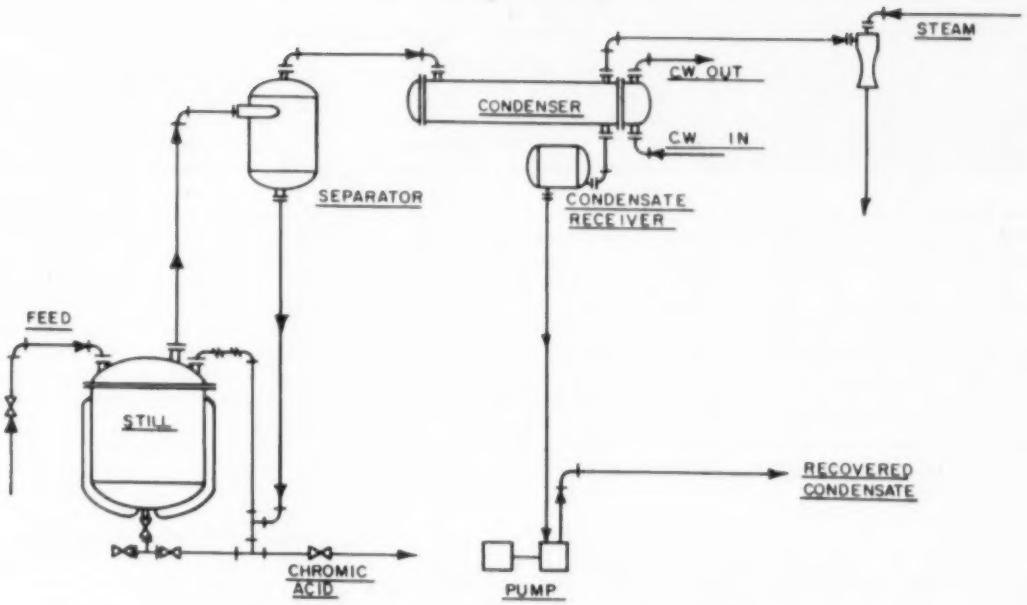


Fig. 2.—Flow chart of a typical chromic acid recovery batch system in detail

tion problem might be as bad, or worse, in decorative plating.

An ion exchange system can be added to the standard acid recovery unit for removal of impurities. Usually, plating strength chrome is diluted to reduce degradation of the ion exchange resin and then run through the ion exchange bed to remove impurities that built up in use. After the dilute solution comes from the ion exchanger, it passes to the concentrating system to be brought up to industrial plating strength.

A number of other concentrated chromic acid baths are used in the metal finishing industry. Among these are cleaners and bright dips for magnesium, zinc die castings, copper and copper alloys. Such solutions become ineffective as impurities build up. The combination of ion exchange and subsequent concentration offers a practical means of regenerating the spent process solutions and also recovering the valuable metallic impurities.

The standard recovery system is used to recover nickel and copper from plating operations with these metals. Recovery of copper salts offers no problem. But, with nickel a tendency towards foaming must be corrected. This can be done by treatment with activated carbon to remove foam producing agents.

In recovery of gold and silver from plating rinse waters, corrosion is not a serious obstacle. However, noble metal ions tend to form immersion deposits on steel, prohibiting use of steel equipment in their recovery. Glassed steel, or stainless steel in some cases, is acceptable. Success of recovery depends upon minimizing impurities in recovered condensate and strict adherence to corrosion resistant materials of fabrication.

Many platers have read the facts clearly. They have seen that the economies gained from the use of acid recovery systems will eventually pay for the system itself. Unfortunately, on occasion the decision to use such apparatus has been hastened by a court injunction. However, a number of plants recognize that it is better to make the decision themselves than to be forced into it by a local pollution abatement group. These companies feel that removal of a pollution problem and cooperation with local groups automatically establishes better community relations and saves money, too.

E. W. Neben was born in New York City, and has a Masters Degree in Mechanical Engineering. He is a graduate of both Cooper Union and Polytechnic Institute of Brooklyn. Author of a number of plating articles, he is a licensed professional engineer in several states and has national registration as a professional engineer. Neben has been with The Pfaudler Co., Rochester, N. Y., for eight years, and at present is their acting chief engineer. Previously he served in engineering capacities with Colgate-Palmolive Co. and The M. W. Kellogg Co. Neben is a member of the American Society of Mechanical Engineers, American Institute of Chemical Engineers and the National Society of Professional Engineers. As a sportsman and conservationist, water pollution became a serious interest before he knew industry could do something about the problem.

Equipment and Supplies

Use the convenient Reader Service Card to obtain additional information on any of these items

E—100. Flame Resistant and Insulating Tapes—A new flame resistant, high strength glass cloth tape has been announced by the Permacel Tape Corporation.

The tape, Permacel 621, is for uses such as sealing and binding of joints in hot air ducts, sealing and protecting ducts or pipes carrying high temperature exhaust fumes, and for identification markings where flameproofness is required. The tape also is used for bundling, reinforcing and holding applications where strength, abrasion resistance and permanency are required.

The tape is composed of a glass cloth backing and a self extinguishing rubber base pressure-sensitive adhesive mass. The backing is flameproof and the adhesive will extinguish itself when the flame source is removed.

A new 2-in-1 silicone glass cloth electrical tape also has been developed by Permacel.

Designated Permacel 211, the latest addition to the company's line of electrical tapes is the result of more than three years of product research and market development. Among the unique properties claimed for Permacel 211 by testing engineers are its dielectric strength of 5,000 volts and its high temperature insulation properties. The tape will withstand exposure to 550 degrees F.

Recommended uses for Permacel 211 Silicone glass cloth electrical tape are holding and insulating of wires in the manufacture of transformers, coils, motors and generators, as protection against molten solder in solder-dipping operations; and in various types of heating equipment such as ovens, heated coils and electrical heating elements where a hold job needs to be performed under high temperatures.

E—101. Large Capacity Spray Nozzle—A new, large capacity flat spray nozzle has been added to Spraying Systems Company's Veejet line. Identified as the 2-U-Veejet, this new nozzle is the largest of its type ever produced by the company. Capacity of this new type nozzle ranges from 73 gpm at 15 psi to 330 gpm at 300 psi. It is supplied in two types of spray angles. The nozzle is designed free of cores, vanes or obstructions of any kind and is made with a 2" male pipe connection. Designed for heavy duty cooling and washing operations, the 2-U-Veejet is also suitable for other applications where a large capacity flat spray is desired.

E—102. Salt Formula for Stripping—Only four-minutes immersion in an oxidizing molten salt bath completely strips 2¼ pounds of tough, tenacious plastisol from steel baskets.

The work is accomplished by the Kolene process. Its basis is a patented salt formula known as Kolene No. 5. It is used in an insulated pot surrounded by an outer steel shell.

Baskets are lowered into the bath by an overhead crane, then transferred to an adjoining water-rinse tank after stripping.

Residue settles into a removable sludge pan at the base of the Kolene pot.

Average weight of the coated baskets is 12¾ pounds. They hold various small parts for acid dipping in the plating operation of a Detroit manufacturer.

When the plastisol deteriorates in use—(such as in acid pickling, plating, material handling, etc.)—the baskets are stripped and re-coated.

E—103. Buffs for Castings—United Buff Products Corporation, has released new Type K and Type Q pressure-cooled buffs to their distributors.

The units are said to be two of the latest developments in the field of buffing. They have been developed and perfected especially for finishing of die castings or permanent mold castings.

The action of these buffs tends to remove excessive buffing compound residues from parts being buffed according to the manufacturers, leaving a cleaner finish preparatory to the plating cycle.

E—104. Direct Standard for Acids—From the reagent researchers of the Fisher Chemical Manufacturing Division comes a primary standard for acids, a high-purity stable material permitting direct one-step acid standardization.

Until now, of course, bases could be satisfactorily standardized against potassium acid phthalate, but for acids no comparable acidimetric standard was available. (Laboratory workers generally had to standardize their acids against bases, which first had to be standardized against the phthalate—a double step.)

The new standard—Fisher Certified Tris (hydroxymethyl)-aminomethane (or THAM)—is individually lot-analyzed, with a minimum assay of 99.90 per cent . . . melting-point range (heated at rate of 6° per minute) is 170.9°–171.3° C. . . . and the pH (for a 0.05-M solution at 25° C) is 10.4.

As an acidimetric standard, THAM has 6 advantages for dilute solutions of strong acids: (1) a high equivalent weight of 121.36; (2) low moisture pick-up; (3) doesn't absorb CO_2 from the air; (4) long shelf life (over 2 years if kept tightly closed!); (5) reacts stoichiometrically; (6) doesn't require further drying for ordinary laboratory standardizations.

E—105. Aluminum Etchant—Hanson-Van Winkle-Munning Co. has announced a newly developed aluminum etchant which reportedly results in better looking, more evenly etched aluminum surfaces.

H-VW-M's new 85S aluminum cleaner was developed for use as a caustic etchant bath to effectively clean and brighten aluminum surfaces. It contains an inhibitor which is said to eliminate formation of scale on tank walls and coils. It also provides a built-in means of minimizing formation of sodium aluminate—an etching inhibitor at high concentrations—providing maximum utilization of the caustic soda.

H-VW-M provides complete operating instructions and analytical processes for the new etchant. For example, the bath is initially made up with 8 oz/gal of 85S etchant. As sodium aluminate builds up, the etchant concentration is increased so as always to exceed sodium aluminate content by 3 oz/gal. The latter will reach a maximum of about 15 oz/gal.

By maintaining this excess etchant content, the bath can be operated for long periods without dumping, since hydrous aluminum oxide will settle out in the form of sludge. Dumping is necessary only when sludge becomes excessive, and it can be flushed through standard sewage facilities or recovered, if desired.

E—106. Industrial Thermostat—A general purpose industrial thermostat, with temperature ranges up to 700 F, has been announced by the General Electric Company's industrial heating department.

The thermostat is designed for such applications as ovens, sterilizers, water and oil heating, metal platens, process ovens, degreasing tanks, melting pots, and compressed air heaters.

Copper bulbs and capillaries are supplied for applications up to 250 F, and steel bulbs and capillaries for use up to 700 F. Standard bulb diameters are ⅜ and $\frac{3}{16}$-in.; capillary lengths are available up to 180 in.

E—107. Evaporation Barriers—As a solution to evaporation losses, the American Agile Corp. has announced an evaporation barrier specifically designed for vapor retardation by as much as 75 per cent.

Known as Agile Mini-Vaps, the barriers are in essence expanded polyethylene miniature floats containing thousands of tiny air cells for bouyancy and light weight. They exhibit the chemical and solvent resistance of polyethylene, and in roughest use, cannot be punctured or broken.

The specially engineered surface contours provide for extensive interlocking

Another Richardson Allen Engineering "First"

Demonstrating the same unsurpassed initiative, ingenuity and craftsmanship which, over the years, have set the pace of progress for the entire industry. Richardson-Allen engineers—working in close cooperation with Westinghouse engineers—have developed and perfected the ultimate in power rectification.

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HERMETICALLY SEALED JUNCTIONS — HIGH TEMPERATURE OPERATIONS

VERSATILITY—Richardson-Allen silicon rectifiers are now available for the plating and industrial fields in ratings up to 500 kws.

EFFICIENCY—Richardson-Allen silicon rectifier units are now supplying major industries with an unprecedented amount of direct current—with no loss in efficiency, no aging and no apparent limit to the life of the silicon junctions. Single silicon junctions are designed to withstand up to 300 vpi.

ECONOMY — Occupying unbelievable small space, the initial cost is often lower than other conversion methods; practically no maintenance is ever needed and when installation savings and power savings are figured the total amount is impressive.

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and clustering at the surface of volatile solutions.

Suggested applications for the product include plating tanks, cleaning and pickling tanks, solvent and oil storage, rinse tanks, anode treatment tanks, and many others.

E—108. Metal Cleaning Slusher—Quick cleaning of metal parts without hand labor is the purpose of an improved motor driven slusher developed by Belke Manufacturing Co.

Material for cleaning is suspended in the cleaning or rinsing solution on a horizontal rod which moves on an arc.

The parts move up and down also sidewise through the solution producing a slushing action that washes away the dirt. The parts may be suspended on plating racks, in baskets or on wires.

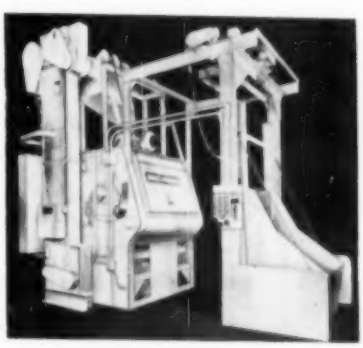
E—109. Germanium Rectifiers—A new line of germanium rectifiers are to be introduced to the electroplating field. Designed and engineered by Rapid Electric Co., the new line comprises models rated at 750, 1500, 2500, and 5000 amperes.

Engineered with economy in mind, these units will sell at prices lower than similar rated selenium models. Called the Golden Line, these units will be the full control type of tap switch design with a unique style of switching arrangement. A balanced full wave circuit provides less than 5 per cent ripple.

Newly designed protective devices safeguard the germanium junctions. Instantaneous in action, unit shut-off is automatic and positive in the event of overload.

Its magnetic starter features overload protection against excessive power input. All models are fan cooled.

E—110. New Abrasive Cleaning Machine—A new size of Super Tumblast airless abrasive blast cleaning machine for cleaning sand, scale, oxides, and other contaminants from metals has been introduced by Wheelabrator Corp. This batch-type machine is for work that can withstand a tumbling action. It has an operating load capacity of 14 cu. ft.



In this machine, a super-capacity abrasive-hurling wheel throws 830 pounds of abrasive per minute, or more than twice as much abrasive per minute as any similarly sized wheel previously used. The abrasive shower from the new super-capacity wheel spreads over the cleaning chamber in a uniform manner and reportedly cleans faster.

The 14-cu. ft. Super Tumblast is available with either of two separators, one with super efficiency for foundry applications and the like, and another for less exacting requirements. The super-efficient separator is perhaps the greatest single cost saver in the machine because it affects so many elements.

meet our star salesman

Our best "door-opener" and "contract-closer" is the product itself. On its merits it has built us a "blue chip" customer list.

Why not see for yourself how good BFC Chromic Acid really is by sending us an order to cover your next spot need?

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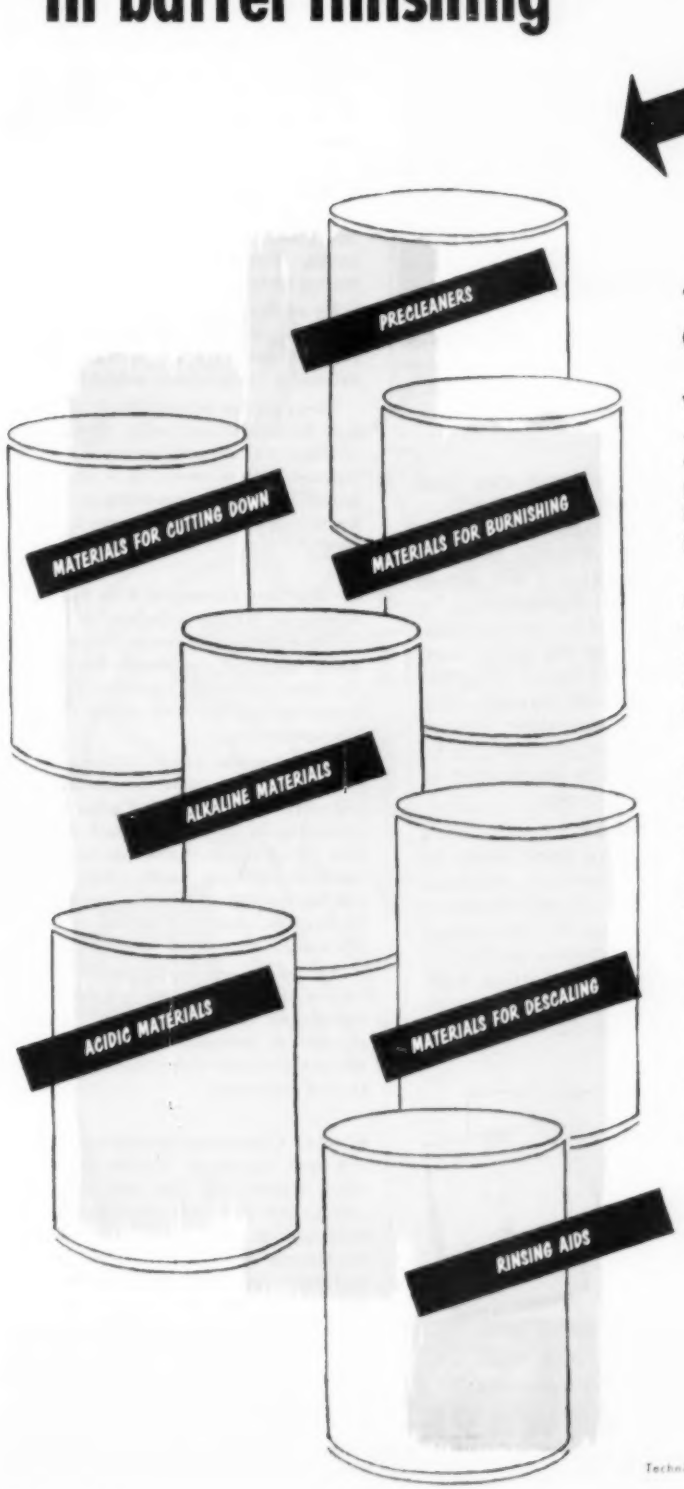
for INCREASED production and lower cost in barrel finishing



...a whole line of OAKITE Materials

Whether you are deburring or burnishing ... whether you're tumbling hard metal parts or soft metal parts, there's an Oakite compound just right for the job. Your local Oakite Man will be glad to advise which is best for your work.

Whether to pre-clean in tanks or right in the barrel depends on the condition of the work, type and quantity of soil etc. Again your Oakite Man can guide you expertly ... supplying a cleaner that cuts costs as it cuts grease and soil.

The supplying of compounds for cutting down, descaling, burnishing is not the sole concern of your Oakite Man. He is just as anxious to pool his experience with your expert knowledge in order to bring you the most efficient, most economical formula for your barrel finishing work. The wide experience of your local Oakite Man qualifies him to discuss barrel speeds, media-to-work ratios and other essentials. His services and the facilities of the Oakite Laboratory are freely available. Technical Bulletin F-9339 yours for the asking. Write Oakite Products, Inc., 40 Rector Street, New York 6, New York.

SPECIALIZED INDUSTRIAL CLEANING
OAKITE®
MATERIALS · METHODS · SERVICE
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Export Division Cable Address: Oakite

Technical Service Representatives in Principal Cities of U. S. and Canada

EQUIPMENT & SUPPLIES

The Super Tumblast line is the first of batch-type cleaning machines designed to provide the reliable performance required for automatic operation. It is readily converted to automation because of standard power features. A single push button will actuate the entire sequence from loading to unloading, without the observation of an operator.

E—111. Buffing Method—An announcement from the Grav-i-Flo Corp., promises a revolutionary change in methods for finishing brass, zinc-base and aluminum die-cast parts preparatory to plating.

The process is said to produce surfaces and lustre comparable to or surpassing that resulting from conventional buffing. It finishes a multiple mounting of parts in a single, automatically timed operation.

Advantages of the new process, known as Spin-Buff, strike at several costly phases of conventional buffing methods. It eliminates, for one, the need for elaborate blowers and exhaust-ventilating systems. Parts unusual in shape, which, under conventional methods, were difficult to process and meant increased costs for buffs and wheels, are finished in a single operation. One compound is used for all part shapes and sizes.

Operating cycles of the process, it is reported, vary in time from four to 16 minutes. A newly designed fixture for the machine permits locking or unlocking of parts on the fixture with a single turn of a cam, further saving setup time and speeding production.

E—112. Chrome Plating Anodes—Alpha Metals, Inc. are introducing their newly developed Ripple Round lead alloy anode, designed to give maximum in plating surface area.

By adding a deep ripple to the conventional round anode, the surface area has been increased by 6.8 per cent without increase in anode size or weight.

These anodes provide ample cross section to handle extremely high current densities without overheating. They are supplied with a choice of 6 Alpha cast copper alloy hooks, produced in different lengths and different conductor bar openings.

E—113. Dry Chemical Fire System—A compact low-cost automatic dry chemical fire extinguishing system for flammable liquid, electrical and textile fire hazards has been developed by Ansul Chemical Company, manufacturer of dry chemical fire equipment.

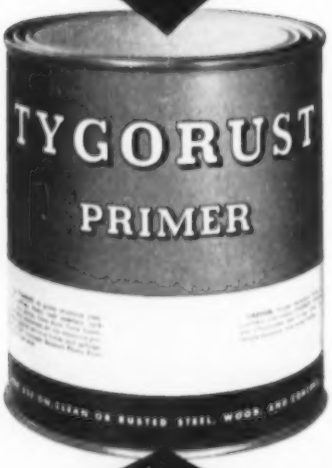
The 30-pound piped system (PS-30) can be operated either automatically or manually. It is intended primarily for protection of moderately-sized hazards, such as paint spray and dip operations, small transformer vaults, heat-treating and oil quench operations, ovens, overhead cranes, stationary engines and textile lint hazards.

Depending on requirements of the hazard, the system can provide total flooding or local application. Special nozzles are provided to give the most efficient discharge of dry chemical for each type of application.

E—114. Centerless Pleated Cloth Buff—A new "centerless" flexible cloth buff which replaces full disc buffs for faster cutting and high, soft coloring has been developed by American Buff Co. Pleating the bias-cut cotton has provided a strong buff that wears longer than a full disc buff and remains soft and flexible according to the manufacturer.

The patented centerless construction feature of the new buff is reported to permit high running speeds without burning or discoloring the work. Instead of being fastened to a solid center, the buff units are securely held in place by a special

DON'T WASTE TIME AND LABOR ON RUST USE



THE "NO-PREP" PRIMER

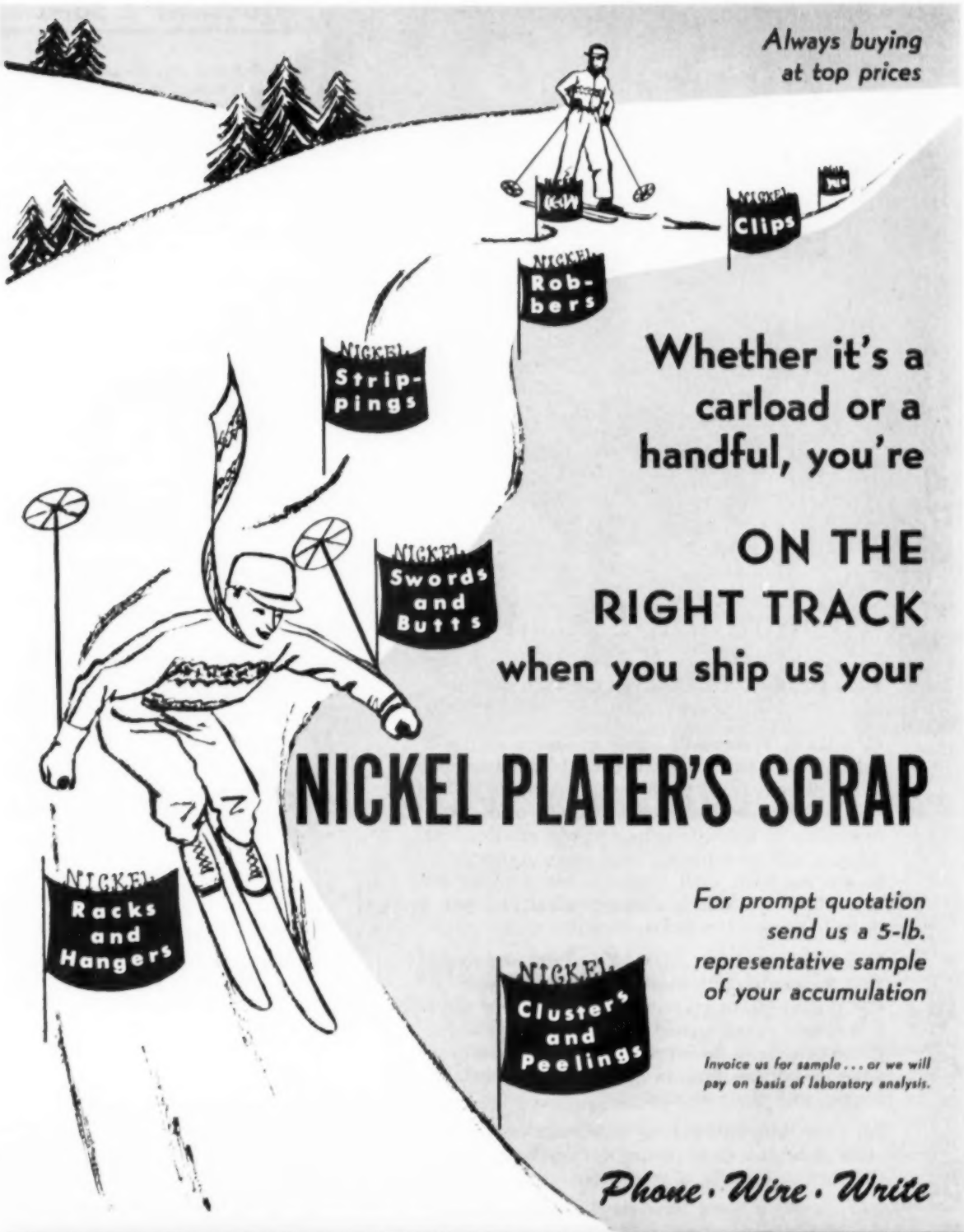
Merely remove loose rust and scale, and loose old paint . . . apply Tygorust and you're ready to topcoat. Tygorust locks finish coats securely to rusty steel, damp or dry, without sandblasting or other costly surface preparation. Firmly adhering old paint need not be removed since Tygorust may be used over virtually any type of paint (excepting bituminous). Rust penetration is so thorough there is no danger of under film rust-creep.

Tygorust works equally well under all types of finish coats. In fact, it's an excellent all-round primer for virtually all industrial applications. But for maximum corrosion resistance and complete customer satisfaction with the finished job — topcoat with Tygon Protective Paints.

This Tygon Painters Manual presents the complete Tygorust story plus 30 pages of helpful painting data. Write for your free copy today.

PLASTICS AND SYNTHETICS DIVISION
U. S. STONEWARE
AKRON 9, OHIO

418-E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Clips
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NICKEL
Clusters
and
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carload or a
handful, you're
ON THE
RIGHT TRACK
when you ship us your
NICKEL PLATER'S SCRAP
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send us a 5-lb.
representative sample
of your accumulation
Invoice us for sample . . . or we will
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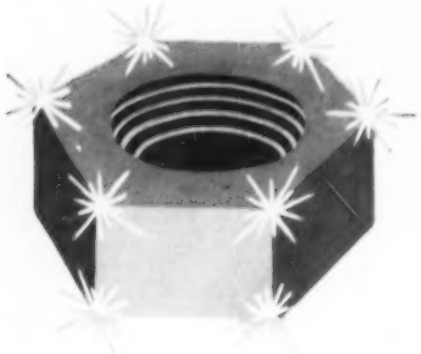
BLUE-

WHITE

BRILLIANCE



for Cadmium Plated Parts

Until you use CADMAX, you cannot realize how smooth and bright your cadmium-plated parts will be.

CADMAX, Federated's highly concentrated liquid brightener for barrel and still cyanide cadmium plating, is not like any other brightener. It contains nothing that can produce breakdown products or organic impurities. It is low-foaming and will give brilliant deposits over an extremely wide range of current. It will not burn, even when the cadmium content of the bath is low. It produces excellent results in baths of very low nickel content.

You can convert to CADMAX quickly and easily. It is compatible with most organic brighteners and carbon treatment is not required unless the bath is seriously contaminated. A new bath containing CADMAX needs no breaking in. Federated's adjuster solution, furnished free, gives you perfect plating with the first load.

Let your Federated plating distributor tell you more about this great plating development. Or write us directly, if you prefer.

Federated first in the non-ferrous field FMD

Federated Metals

DIVISION OF AMERICAN SMELTING AND REFINING COMPANY
120 BROADWAY, NEW YORK 5, N. Y.
In Canada: Federated Metals Canada, Ltd., Toronto and Montreal

Aluminum, Anodes, Babbitts, Brass, Bronze, Die Casting Metals, Lead, Lead Products, Magnesium, Solders, Type Metals, Zinc Dust

gripping steel ring, leaving space around the shaft through which cool air circulates in all directions.

Simplified design of the steel clinch ring permits an almost unlimited number of sections to be locked together to build a buffing face up to twelve inches or more.

E—115. Rust Remover and Emulsion Cleaner—Two new metal finishing products have been announced by The Mitchell-Bradford Chemical Co.

Alkaline De Ruster No. 2 is an alkaline salt mixture to be mixed with water and used non-electrolytically at 180° F to boiling to remove rust quickly and economically. It will also remove many types of paints. It will not cause hydrogen embrittlement, will not attack the base metal, is non-toxic and after removing rust, tends to prevent further rusting or oxidation of the base metal.

The second product Emulsion Cleaner No. 26 is a new organic emulsion cleaner designed for easy removal of heavy oils, greases and soils. It removes grease and grime from metal which can then be rinsed thoroughly in water. Reportedly, it will remove buffing compounds.

E—116. Zinc and Cadmium Brighteners—Allied Research Products, Inc., manufacturer of ARP plating Chemicals and Iridite chromate conversion coatings has announced the addition to its line of two new brighteners: ARP No. 52, a zinc barrel brightener addition agent that provides a uniform lustrous deposit at lower cost; and ARP No. 41, a brightener addition agent for cadmium that produces improved luster, at less cost.

The former is a powder, available in 10-50 and 100 lb fibre drums. It provides luster directly from the zinc barrels and, while the finish may tend toward a slight yellow cast, ½ per cent nitric acid or an Iridite dip produces a clear-bright surface. Advantages claimed for ARP No. 52 lie in its low cost per pound and its low rate of consumption and stability.

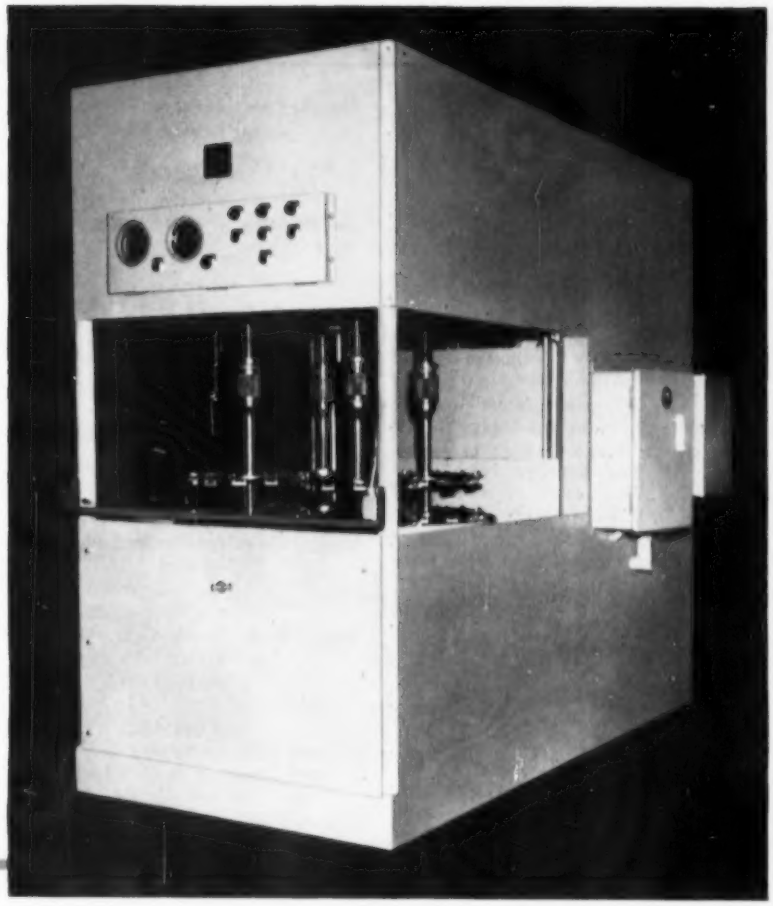
The cadmium plate brightener is in liquid form, available in 5-gal. pails. It provides improved luster, operates over a wide range of current densities, is compatible in plating solutions formerly using addition agents containing nickel salts, and rinses unusually free of water breaks.

E—117. Sandblast Hood—For protection under moderate blasting conditions at minimum cost, the Pulmonson Safety Equipment Corp. announces their No. 30 sandblast hood. It is reported to be lightweight, comfortable, with fibre headframe and replaceable hammock assembly. There is a choice of wire screen window or laminated glass with wire screen shield.

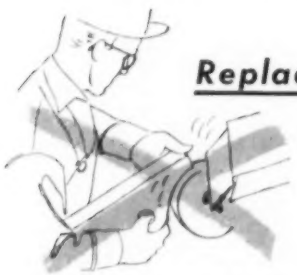
TUMBLE
GRAV-I-FLO
FINISH

OFFERS

Spin-Finish



AN ENTIRELY NEW PARTS-FINISHING PROCESS



Replaces **hand and automatic buffing!**

- ☑ One-operation finishing, even of the most complex parts
- ☑ Completely dry process . . . no lubricants needed
- ☑ Dust and fume free . . . no need for exhaust or ventilating systems
- ☑ No set-up time required for changing jobs

Sets New Standards In Pre-Plating Finishing Costs

Wipe the slate clean of all present concepts of speed, efficiency and costs in pre-plating finishing of brass, zinc-base and aluminum die-cast parts! In one short, automatically-timed operation—and on a *multiple mounting* of parts—new SPIN-FINISH produces surfaces and lustre equal to or surpassing that of buffing.

Savings on time, labor and plant space are tremendous! Eliminated are vast exhaust and ventilating systems! You'll want to learn all about this startling revolutionary method of finishing. Write for complete information now.

GRAV-I-FLO CORPORATION

Dept. PL-1, 400 Norwood Avenue, Sturgis, Michigan

BRANCH DIRECTORY

ADELAIDE
Secretary-Treasurer: E. J. Down
Room 30, 17 Currie St.,
Adelaide, S. A., Australia
Meeting Place: 17 Waymouth St.
Adelaide
Day of Month: Last Friday

ALLENTOWN-READING
Secretary-Treasurer: Raymond Housel
363 Warren St., Phillipsburg, N. J.
Meeting Place: Scotty's Anchorage
Main St.
Emmaus, Pa.
Day of Month: Fourth Thursday
Time: Dinner 7:00 P.M.—Meeting 8:00 P.M.

BALTIMORE-WASHINGTON
Secretary: Carl H. Thiede
8426 Piney Branch Rd., Silver Spring, Md.
Meeting Place: Chemistry Bldg.
National Bureau of Standards
Washington 25, D. C.
and
Marling House
20 East Fayette St.
Baltimore, Md.
Day of Month: Second Tuesday
Time: 8:00 P.M.

BOSTON
Secretary-Treasurer: Dr. George P. Swift
53 Galen St., Watertown 72, Mass.
Meeting Place: Hotel Statler
Boston, Mass.
Day of Month: First Thursday
Time: Dinner 6:00 P.M.—Speaker 8:15 P.M.

BRIDGEPORT
Secretary-Treasurer: Robert G. Parker
25 Beverly Rd., Trumbull, Conn.
Meeting Place: Hotel Barnum
Bridgeport, Conn.
Day of Month: Second Friday
Time: 8:00 P.M.

BUFFALO
Secretary: Fred Goeckel
139 Overbrook, Tonawanda, N. Y.
Meeting Place: Markeen Hotel
Main & Utica
Buffalo, N. Y.
Day of Month: Last Friday
Time: 6:30 P.M.—Meeting 8:00 P.M.

CAPITOL DISTRICT
Secretary: Edward V. Raymond
Broadlawn North St., Cheshire, Mass.
Meeting Place: Panetta's Restaurant
Menands, N. Y.
Day of Month: First Monday
Time: 8:00 P.M.

CENTRAL MICHIGAN
Secretary-Treasurer: E. J. Bosca
411 Third St., Jackson, Mich.
Meeting Place: Porter Hotel
Lansing, Mich.
and
Hayes Hotel
Jackson, Mich.
Day of Month: Second Tuesday
Time: 7:00 P.M.

CHICAGO
Secretary-Treasurer: Paul Glab
882 N. Paulina St., Chicago 22, Ill.
Meeting Place: The Western Society of Engineers
Day of Month: Second Friday
Time: 7:00 P.M.

CINCINNATI
Secretary: David L. Kaplan
6227 Stover Ave., Cincinnati 13, Ohio
Meeting Place: Engineering Society Headquarters
McMillan at Woodburn
Cincinnati 6, Ohio
Day of Month: Fourth Wednesday
Time: Dinner 6:30 P.M.—Meeting 7:30 P.M.

CLEVELAND
Secretary-Treasurer: Robert I. Peters
12901 Elmwood Ave., Cleveland 11, Ohio
Meeting Place: Hotel Carter
Cleveland, Ohio
Day of Month: First Friday
Time: 8:00 P.M.

COLUMBUS
Secretary: Halvor Christianson
2593 Andover Rd., Columbus 21, Ohio
Meeting Place: Battelle Memorial Institute
Columbus, Ohio
Day of Month: First Friday
Time: 8:00 P.M.

DALLAS-FORT WORTH
Secretary-Treasurer: A. C. Fricke
212 Julian St., Dallas, Tex.
Meeting Place: Lennox Hotel
Grand Prairie, Tex.
Day of Month: Third Wednesday
Time: 6:30 P.M.

DAYTON
Secretary: Richard M. Clinehens
3206 Harwood St., Dayton 10, Ohio
Meeting Place: Hotel Biltmore
Dayton, Ohio
Day of Month: Third Wednesday
Time: 8:00 P.M.

DETROIT
Secretary-Treasurer: E. J. Kubis
Wyandotte Chemicals Corp., Wyandotte, Mich.
Meeting Place: Sheraton-Cadillac Hotel
Detroit, Mich.
Day of Month: First Friday
Time: 8:00 P.M.

GRAND RAPIDS
Secretary: Donald Smith
1825 Martin, S. E., Grand Rapids, Mich.
Meeting Place: Finger's Restaurant
Day of Month: Second Friday
Time: 7:00 P.M.

HAMILTON
Secretary: N. A. Graham
Stoney Creek Post Office, Hamilton, Ontario, Canada
Meeting Place: Fischer's Hotel
Hamilton, Ont., Canada
Day of Month: 20th
Time: 8:00 P.M.

HARTFORD
Secretary: Stanley Platoz
26 Erwin Pl., New Britain, Conn.
Meeting Place: Hotel Bond
Hartford, Conn.
Day of Month: Third Monday
Time: 7:45 P.M.

HOUSTON
Secretary-Treasurer: H. C. Van Wagner
2812 Center St., P. O. Box 7568, Houston, Tex.
Meeting Place: Ben Milam Hotel
Day of Month: Third Tuesday
Time: 7:00 P.M.

INDIANAPOLIS
Secretary: Paul B. Freeman
316 N. Wallace St., Indianapolis, Ind.
Meeting Place: Fox Steak House
1207 E. Washington St.
Indianapolis, Ind.
Day of Month: First Wednesday
Time: Dinner 6:30 P.M.—Meeting 8:00 P.M.

KANSAS CITY
Secretary: Olin Bock
5317 West 58th St., Mission, Kans.
Meeting Place: Berkshire Hotel
Day of Month: Second Thursday

LANCASTER
Secretary-Treasurer: George S. Wells
255 Hawthorn Dr., Lancaster, Pa.
Meeting Place: September, December and April Meetings
Hanover, York and Harrisburg, respectively
All other meetings
Old Mill Inn
Lancaster, Pa.
Day of Month: Second Friday
Time: 8:00 P.M.

LOS ANGELES
Secretary: Frank Virgil
3628 E. Olympic Blvd., Los Angeles 23, Calif.
Meeting Place: Roger Young Auditorium
936 West Washington
Los Angeles, Calif.

Day of Month: Second Wednesday
Time: Dinner 7:00 P.M.—Meeting 8:00 P.M.

LOUISVILLE

Secretary-Treasurer: Joseph G. Sterling
6025 Peggy Dr., Louisville 13, Ky.
Meeting Place: Kapfhammers Party House
1506 S. Shelby St.
Louisville, Ky.
Day of Month: Third Thursday
Time: Dinner 6:30 P.M.—Meeting 8:00 P.M.

MELBOURNE

Secretary-Treasurer: B. D. Reaburn
Park Rd., Ringwood, Australia
Meeting Place: Metallurgy Theatre
Melbourne Technical College
Melbourne, Australia
Day of Month: Third Thursday
Time: 7:30 P.M.

MILWAUKEE

Secretary-Treasurer: Sy Taterczynski
3463 N. Dousman St., Milwaukee 12, Wisc.
Meeting Place: Ambassador Hotel
Milwaukee, Wisc.
Day of Month: First Friday
Time: 8:00 P.M.

MISSISSIPPI VALLEY

Secretary-Treasurer: Paul G. Chamberlain
2131 Harrison St., Davenport, Iowa
Meeting Place: Tower Restaurant
7th St. & 30th Ave.
Moline, Ill.
Day of Month: Third Wednesday
Time: Dinner 6:30 P.M.—Meeting 8:00 P.M.

MONTREAL

Secretary-Treasurer: William T. Scott
1430 Dutrisac St., Apt. 12, Ville St. Laurent, Quebec, Canada
Meeting Place: Mont Royal Hotel
Montreal, Que., Canada
Day of Month: First Tuesday
Time: 8:00 P.M.

NEWARK

Secretary: Dr. D. Gardner Foulke
455 Johnston Dr., Watchung, RFD 3, Plainfield, N. J.
Meeting Place: Robert Treat Hotel
Newark, N. J.
Day of Month: Third Friday
Time: 8:15 P.M.

NEW HAVEN

Secretary-Treasurer: Bernard J. Gaffney
40 Filbert St., Spring Glen Hamden 14, Conn.
Meeting Place: Mason Laboratory
Yale University
New Haven, Conn.
Day of Month: Second Tuesday
Time: 8:00 P.M.

NEW YORK

Secretary-Treasurer: Milton Nadel
41-15 50th Ave., Long Island City 4, N. Y.
Meeting Place: Hotel Statler
New York, N. Y.
Day of Month: Second and Fourth Friday
Time: 8:00 P.M.

PHILADELPHIA

Secretary: I. William Marcovitch
1302 St. Vincent St., Philadelphia 11, Pa.
Meeting Place: Engineers' Club
1317 Spruce St.
Philadelphia 7, Pa.
Day of Month: Fourth Monday
Time: 8:00 P.M.

PITTSBURGH

Secretary: F. W. Stevens
Mounted Route No. 7, Ellwood City, Pa.
Meeting Place: Gateway Plaza
Pittsburgh, Pa.
Day of Month: First Wednesday
Time: Dinner 6:30 P.M.
Meeting 8:00 P.M.

PORTLAND

Secretary-Treasurer: Dale Tweed
3950 N. W. Yeon Ave., Portland, Ore.
Meeting Place: Various
Day of Month: Second Tuesday
Time: 6:00 P.M.

PROVIDENCE-ATTLEBORO

Secretary: F. L. Sherman
17 Hillsdale Dr., Cranston 10, R. I.
Meeting Place: Providence Engineering Society Bldg.
195 Angell St.
Providence, R. I.
Day of Month: Third Monday
Time: 8:00 P.M.

ROCHESTER

Secretary-Treasurer: Linwood Morrison
1240 Weiland Rd., Rochester 13, N. Y.
Meeting Place: 40 & 8 Club
933 University Ave.
Rochester, N. Y.
Day of Month: Third Monday
Time: 8:00 P.M.

ROCKFORD

Secretary-Treasurer: E. J. Budden
122 19th St., Rockford, Ill.
Meeting Place: Faust Hotel
Day of Month: Second Monday
Time: 7:00 P.M.

SAGINAW VALLEY

Secretary: Douglas T. Rewbothom
616 E. Baker St., Flint 5, Mich.
Meeting Place: Zehnder
Frankenmuth, Mich.
Day of Month: Second Wednesday
Time: 7:00 P.M.

ST. JOSEPH VALLEY

Secretary-Treasurer: Henry A. Meers
2001 Bergen St., South Bend, Ind.
Meeting Place: L. H. Inn
Mishawaka, Ind.
Day of Month: First Wednesday
Time: Dinner 6:30 P.M.—Technical Session 8:00 P.M.

ST. LOUIS

Secretary-Treasurer: Ward W. Kelly
7046 Deerpath Dr., St. Louis 23, Mo.
Meeting Place: York Hotel
Day of Month: Second Wednesday
Time: 7:00 P.M.

SAN ANTONIO

Secretary-Treasurer: T. H. Collard, Jr.
442 Pilgrim Dr., San Antonio 1, Tex.
Meeting Place: DeWinne's Belgium Inn
3119 W. Commerce St.
San Antonio, Tex.
Day of Month: Third Monday
Time: 7:00 P.M.

SAN FRANCISCO

Secretary: William A. Nairne
1495 Custer Ave., San Francisco, Calif.
Meeting Place: Patores Restaurant
2550 El Camino Real
Redwood City, Calif.
Day of Month: Second Thursday
Time: 7:30 P.M.

SEATTLE-PUGET SOUND

Secretary: William P. Foley
3674 4th Ave., So., Seattle 4, Wash.
Meeting Place: As announced (temporarily)
Day of Month: Third Tuesday
Time: 8:00 P.M.

SOUTHEASTERN

Secretary-Treasurer: Robert H. Probert
Box 2410, Georgia School of Technology, Atlanta, Ga.
Meeting Place: Belmont Steak House
Atlanta, Ga.
Day of Month: Second Friday
Time: 7:30 P.M.

SOUTHERN-TIER

Secretary-Treasurer: Roger Wheeler
Box No. 48, Killawog, N. Y.
Meeting Place: (Alternate), Ah-wa-ga Hotel
Owego, N. Y.
Iron Kettle Inn
Waverly, N. Y.
Day of Month: Third Tuesday
Time: 7:30 P.M.

SPRINGFIELD

Secretary: Henry L. Heissfeld
74 Chilson St., Springfield, Mass.
Meeting Place: Blake's Restaurant
15 Market St.
Springfield, Mass.
Day of Month: Fourth Monday
Time: Meeting 6:30 P.M.
Dinner 7:00 P.M.
Technical 8:00 P.M.

Branch Directory

(Continued)

SYDNEY

Secretary-Treasurer: J. E. W. L. Smith
38 St. Ann St., Merrylands, Australia
Meeting Place: Trust Building
Cor. Martin Pl. & Castlereigh St.
Sydney, Australia
Day of Month: Second Thursday
Time: 7:30 P.M.

SYRACUSE

Secretary: Milton F. Stevenson
313 Beech St., No. Syracuse 12, N. Y.
Meeting Place: Liderkrantz
621 Butternut St.
Syracuse, N. Y.
Day of Month: Third Wednesday
Time: Dinner 6:30 P.M.—Meeting 8:00 P.M.

TOLEDO

Secretary-Treasurer: G. H. Bergeman
703 Pine St., Fremont, Ohio
Meeting Place: Angelo's Spaghetti House
Stickney Ave.
Toledo, Ohio
Day of Month: First Thursday
Time: Dinner Meeting 6:30 P.M.—Business Meeting 8:00 P.M.

TORONTO

Secretary-Treasurer: E. F. Hutt
85 Barford Rd., Rexdale, Ontario, Can.
Meeting Place: Royal York Hotel
Toronto, Ont., Canada
Day of Month: Second Friday
Time: Dinner 6:30 P.M.—Meeting 8:30 P.M.

TWIN CITY

Secretary-Treasurer: Robert L. Buckley
205 11th Ave., So., Minneapolis 15, Minn.
Meeting Place: Jax Cafe
Day of Month: First Monday
Time: 7:00 P.M.

WATERBURY

Secretary-Treasurer: Albert G. Griffith
94 Ridgeview Pl., Cheshire, Conn.
Meeting Place: Colonial Room of Hotel Elton
Waterbury, Conn.
Day of Month: Second Thursday
Time: Dinner 6:00 P.M.—Business 7:00 P.M.
Educational Meeting 8:00 P.M.

WESTERN ONTARIO

Secretary-Treasurer: D. R. Mainland
21 Maple St., Chatham, Ont., Canada
Meeting Place: William Pitt Hotel
Chatham, Ont., Canada
Day of Month: Third Friday
Time: 6:30 P.M. Dinner-Meeting

WICHITA

Secretary: Glenn Summers
1422 S. Martinson, Wichita 13, Kans.
Meeting Place: None permanent
Day of Month: Fourth Wednesday
Time: 6:30 P.M.

Temporary Charter

BRITISH COLUMBIA

Secretary: Jim Lee
3666 Three Rd., Lulu Is.
Vancouver, B. C., Canada

MEET MR. PRESIDENT

Theodore Voyda has been a member of the American Electroplaters' Society for the past twelve years and was elected president of the Waterbury Branch in 1956. Originally a Hartford Branch member, he is also a past president of that organization.

Ted is an honor graduate of the University of Connecticut, receiving his Bachelor of Science in chemistry degree in 1939, and his Master of Science degree in 1944. His first technical position was at Pratt and Whitney Aircraft Division of United Aircraft where he subsequently became electrochemical supervisor in the Materials Development Laboratory. In 1946 he joined Apothecaries Hall Company where he presently holds the post of technical director of the Metal Finishing Products Division.

Ted has appeared on numerous occasions as a speaker before AES gatherings and is the author of several papers pertaining to electroplating. He has served on a number of regional and national convention committees. In addition to the AES, he holds memberships in the Electrochemical Society, the American Chemical Society, ASTM, and the Society of Sigma Xi.

He resides in Watertown with his wife and two daughters. His favorite summer hobby is golf which he has yet to master. His winter hobby is bridge.

Newark Branch Leads at 8-Month Mark

At the eight-month point, namely from April 1, 1956 to December 1, 1956, the Newark, Montreal (Canada) and Mississippi Valley Branches lead the field in their respective divisions in the AES's annual branch membership expansion competition.

Meantime, the Society's aggregate membership, in all classifications including Sustaining Memberships, stands at a record 7,183 members as of December 1, 1956 compared with the 7,096 member total as of December 1, 1955.

An award of $50 is presented yearly by the Society at the Annual Convention to those Branches in three divisions achieving the greatest membership expansion during the Society's fiscal year commencing April 1. At the current eight-month point, the five leaders in the AES's respective divisions are:

BRANCH MEMBERSHIP COMPETITION

	Members April 1, 1956	New Members	Net Change Membership	Per Cent Change
First Division (126 Members and Over)				
1. Newark	271	44	+42	+15.5
2. Detroit	672	39	+22.5	+ 3.3
3. Toronto	164	19	+16	+ 9.8
4. Chicago	456	14	+19.5	+ 2.1
5. Grand Rapids	183	12	+ 5.5	+ 3.0
Second Division (70-125 Members)				
1. Montreal	89	17	+14	+15.8
2. San Francisco	80	12	+11	+13.8
3. New Haven	96	10	+ 9	+ 9.4
4. Baltimore-Washington	99	10	+ 5.5	+ 5.6
5. Rochester	91	9	+ 4	+ 4.4
Third Division (10-69 Members)				
1. Mississippi Valley	43	10	+ 9.5	+22.1
2. Houston	31	4	+ 4.5	+14.5
3. Dayton	98	8	+ 4	+ 4.1
4. Louisville	47	7	+ 4	+ 8.5
5. Western Ontario	33	5	+ 4	+12.1

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ANY PLATER CAN AFFORD
THIS NEW ANSWER TO AN
OLD CHROME PLATING PROBLEM

UDYLITE
ZERO-MIST H.T.*

Now You Can Completely Control Mist and Spray from Chromium Plating Baths —

AND DO IT AT A VERY REASONABLE COST

LOW INSTALLATION COST — This new product of Udylite Research is so powerful that you need only $1\frac{1}{2}$ *pounds* to a *1000 gallon* chromium plating solution to get perfect results.

LOW MAINTENANCE COST — The addition of as little as $\frac{1}{4}$ to $\frac{1}{2}$ lb. in an 8-hour working day maintains mist and spray control. Its only loss is through dragout.

COMPLETELY STABLE — It's *completely stable;* it doesn't lose any of its strength during shut downs no matter how long they must be.

OPERATES AT HIGH TEMPERATURES — For the first time *the temperature of the bath has no effect on mist control.* Zero-Mist H.T. works at any bath temperature, even boiling.

EASE OF CONTROL — It's *easy to control.* With the addition of Zero-Mist H.T., a thin foam blanket forms when current is turned on. The foam blanket subsides when the current is turned off, but reforms as the bath is again used. This foam blanket provides the simple visible check for efficient operation.

LOW COST • STABILITY • *HIGH TEMPERATURE OPERATION • VISUAL CONTROL

ZERO-MIST H.T. HAS THEM ALL

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

WORLD'S LARGEST PLATING SUPPLIER

FOR FURTHER DETAILS SEE NEXT PAGE

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ABOUT THE *NEW*

ZERO-MIST H.T.*

ZERO-MIST H.T.

Is a completely stable, powerful surface active additive for chromium plating baths. When added to chromic acid plating solutions it forms a foam blanket which completely eliminates mist and spray. It is indestructible *even at high temperatures.* Additions of Zero-Mist H.T. are required only to replace dragout losses.

ONLY A SMALL QUANTITY IS REQUIRED

The concentrated formula of Udylite Zero-Mist H.T. means that only a small amount is required for the solution. Tests conducted over many months have shown that only one to one-and-one-half pounds of Zero-Mist H.T. are usually required for 1000 gallons of chromic acid solution. This creates a foam blanket about $\frac{1}{2}$" to 1" thick which holds back all mist and spray.

EFFECTIVE IN HIGH TEMPERATURE BATHS

Zero-Mist H.T. controls mist and spray regardless of the temperature of the plating solution. It works as well at high temperatures as it does in low temperature solutions. The most concentrated boiling chromic acid solutions in no way affect its efficiency nor does it cause a breakdown of its chemical properties nor is it affected by the highest anode or cathode current densities used in chromium plating.

IMPROVES HEALTH CONDITIONS

Improvement of health conditions in the plating room is evident immediately when Zero-Mist H.T. is used. Occupational hazard is also reduced with the elimination of spray. Cross currents of air do not blow chromic acid mist in the air of the plating room, a fault common to wide tanks which are difficult to ventilate, as well as tanks of normal width located near open doors or windows.

VISUAL CONTROL

The foam blanket, which is always visible tells you if additions of Zero-Mist H.T. should be made. Zero-Mist H.T. is indestructible, but dragout does cause a need for occasional additions. Usually only a fraction of a pound is required per 8 hour work shift. Once the chromic acid solution is charged with Zero-Mist H.T. the foam blanket appears immediately with the use of the solution. If Zero-Mist H.T. is producing a satisfactory blanket when the tank is shut down, it is not necessary to add more when starting up again, regardless of the time interval, since Zero-Mist H.T. is completely stable.

ELIMINATES WASHING OF EXHAUSTED AIR

When Zero-Mist H.T. is used there is no need for washing the exhausted air. Ventilating systems stay cleaner and require very little maintenance thereby saving many dollars to the chrome plater each year.

GUARANTEED BY UDYLITE

Zero-Mist H.T. is guaranteed by Udylite to be the finest and most economical surface additive for chromic acid baths you have ever used. Order a sample of this remarkable new product today.

THE Udylite CORPORATION
DETROIT 11, MICHIGAN

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Lavin specializes in the manufacture of high purity anodes for all electrodeposition products. This minimizes the buildup of undesirable trace elements in the plating solution. These trace impurities can cause subtle, but definite, corrosion problems in the finished product.

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REPRESENTATIVES IN PRINCIPAL CITIES

PATENT ABSTRACTS

DR. D. GARDNER FOULKE
Manager, Electrochemical Development
Hanson-Van Winkle-Munning Co
Matawan, New Jersey

Copies of patents may be obtained by writing to Commissioner of Patents, Washington, D. C. Price 25 cents each.

No. 2,762,694, September 11, 1956—Etching Aluminum and Its Alloys—K. Newman, assignor to Turco Products, Inc., Los Angeles, Calif.

The method consists of treating the aluminum with a non-corrosive acid solution to remove oxides, then treating with an alkaline etching solution. The acidic solution may contain sulfuric acid, chromic acid and ammonium silico-fluoride, or, in another claim, ortho and pyrophosphoric acids and salts thereof and the pH is 4 or less.

Example II states that 2–6 oz. of:

NaH_2PO_4	84.6%
H_3PO_4	2.0%
$Na_2P_2O_7$	5.0%
Triton X-100	7.0%
iso C_3H_7OH	1.4%

are dissolved in a gallon of water to form the acid solution.

23 claims.

No. 2,763,105, September 18, 1956—Burnishing Wheel—J. Feeley, assignor to Westinghouse Electric Corp., East Pittsburgh, Pa.

A burnishing wheel consisting of a plurality of superimposed laminations of glass fabric and a thermoset resinous binder is described. The binder may contain up to 10 per cent of its weight of a finely divided abrasive.

6 claims, 1 figure.

No. 2,763,536, September 18, 1956—Etching—J. Easley and H. Swayze, assignors to the Dow Chemical Co., Midland, Michigan.

This method refers to etching metal, especially magnesium and zinc printing plates. The bath consists of 2 to 14 per cent HNO_3, a dioctyl sulfosuccinate at least 0.005 per cent of the HNO_3 and not more than 0.1 per cent, from 2 to 15 per cent of diethyl benzene and a thickening agent (gum, gelatin, dextrin, methyl cellulose) in a percentage by weight of the bath—times the ratio of the per cent of dioctyl succinate to the per cent of nitric acid in the bath.

18 claims.

No. 2,763,576, September 18, 1956—Gas Plating—H. Belitz and O. Davis, assignors to The Commonwealth Engineering Co., Dayton, Ohio.

The single claim is as follows: "The method of plating steel shafts with molybdenum metal deposited from a heat-decomposable metal vapor which comprises the steps of restricting the free access of air to a limited surface of the shaft to be plated, establishing a source of heat-decomposable molybdenum metal vapor in the form of a jet under pressure onto said limited surface area to be plated, said metal vapor consisting of hydrogen and molybdenum carbonyl, and subjecting said area to localized heating to raise its temperature thereof to between about 350° F. and 425° F. to cause said impinging metal vapor to decompose and deposit molybdenum metal onto said limited surface area, and removing the decomposition products under conditions to maintain mixing of air into the exhaust stream to a minimum, said removal taking place in a direction opposed to that of said given direction."

No. 2,763,605, September 18, 1956—Electrodepositing Aluminum—M. Miller and C. Baker, assignors to Aluminum Company of America, Pittsburgh, Pa.

The electrolyte consists of at least one aluminum halide (Cl^- or Br^-), guanidine hydrochloride, and at least one aromatic hydrocarbon (C_6H_6, $C_6H_5CH_3$, $CH_3C_6H_4CH_3$), the mol ratio of the aluminum halide to guanidine lying between 1.7:1 and 2.9:1 and the mol ratio of aromatic hydrocarbon to guanidine hydrochloride being at least 0.4:1.

8 claims.

No. 2,763,606, September 18, 1956—Electrodepositing Baths—W. Hespenheide and C. Faust, assignors to American Brake Shoe Co., New York, N. Y.

An aqueous copper lead alloy bath, capable of producing a solid solution of lead in copper, contains 50 to 120 g./l. of copper cyanide, 0.1 to 10 g./l. of lead as lead gluconate, 1 to 50 g./l. free cyanide and sufficient alkali metal hydroxide to provide a pH of at least 8.5.

To obtain a 10 per cent Pb-90 per cent Cu alloy the following bath was used:

Gluconic acid (50% solution)	50 cc/l
KCN	180 g./l.
CuCN	120 g./l.
PbO_2	2.4 g./l.
KOH	to give pH = 11.5

11 claims, 6 figures.

No. 2,763,608, September 18, 1956—Electro-Chemical Treatment—C. Pool, assignor to Philco Corporation, Philadelphia, Pa.

This invention has to do with etching or anodizing small articles, e.g., germanium crystals. The method consists of placing a drop of electrolyte upon the planar surface to limit the amount of surface wetted, then a main body of electrolyte is brought into contact with this drop to form a positive meniscus after which current is allowed to flow.

2 claims, 2 figures.

No. 2,739,108, March 20, 1956—Electroplating Chromium-Nickel Alloy Coatings—M. Quaely, assignor to Westinghouse Electric Corp., E. Pittsburgh, Pa.

The process consists of immersing the object in an aqueous bath containing 150 to 350 g/l of chromic acid and 13 to 60 g/l of nickel chloride, the ratio of Cr:Ni being 14:1 to 4:1, and passing a plating current through the object at 400–2000 asf. The temperature is held below 40° C. The chromium-nickel alloy is bright. Claim 2 describes the addition of 10 ml/l of an organic acid (acetic) and claim 3 describes the immersion of the alloy plated article in hydrochloric acid yields a black finish.

8 claims.

No. 2,739,109, March 20, 1956—Black Chromium-Nickel-Vanadium-Electrodeposits—M. Quaely, assignor to Westinghouse Electric Corp., E. Pittsburgh, Pa.

To the bath described in No. 2,739,108 is added 2 to 10 g/l of vanadium as a soluble compound (the Cr:Ni:V = 20:1.5 to 7½:1½ to 2½ parts) and, upon electrolysis at 400 to 2000 asf, a black adherent coating is obtained.

7 claims.

No. 2,748,023, May 29, 1956—Method and Apparatus for Depositing Copper—Max Meth, Atlantic City, N. J.

This method of copper plating a silvered mirror consists of laying down a silver deposit, then while still wet treating with a copper sulfate solution containing a suspension of metallic (Fe, Cd, Ni, Co, Cr, W, Mo) dust of the order of 300 mesh.

4 claims.

The new ALUNDUM Tumblex "S" abrasive rolls around and through intricate parts; brings high uniformity of radii and surfaces, with smooth finish, to the barrel-finishing of parts as intricate as this gun component. The "before and after" view shows you how the spheres improve external and *internal* areas.

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If you finish parts that have hard-to-contact recesses or intricate shapes, Tumblex "S" tumbling abrasive is the latest development.

Here are the logical reasons why tubing, coil springs, scissor handles, bearing retainers, pump bodies and many other parts benefit by the new shapes and sizes of Tumblex "S" — and by its top-quality as a tumbling abrasive.

- *Tumblex "S" is made in spheres that easily get into areas where other abrasive shapes can't reach.*
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- *Made of famous Norton ALUNDUM abrasive, it cuts fast — resulting in shorter time cycles and lower costs per piece finished.*

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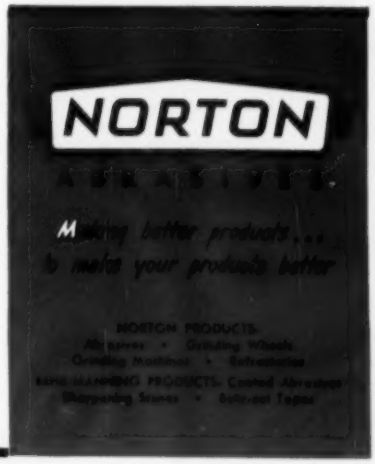

FOR FURTHER INFORMATION, USE READER SERVICE CARD; INDICATE A 134.

(Left) An interesting study in shadows of Place Royale, Montreal, part of the Old World section of steepled churches and gray stone houses. (Right) Place Jacques Cartier, named for the intrepid Frenchmen who explored the Quebec territory in 1535. Montreal City Hall appears in background.

Canadian Border Crossing Should Raise No Qualms for

AES CONVENTIONEERS

To those crossing the Canadian border for the first time, it comes as a most pleasant surprise to find the customs and immigration inspectors so friendly and courteous. Formalities for entry into Canada and return to the United States are extremely simple. No passport is required of a United States citizen, and presentation of a birth certificate or any other acceptable proof of citizenship is all that is required.

United States visitors returning to their home country after a 48-hour stay in Canada may take back with them, free of duty, articles for personal or household use to the value of $200 per person, once every 31 days. (This exemption may include tobacco, cigarettes, foodstuffs.) A family traveling together (parents, or parents with minor children) may group their individual exemptions for the purchase of one or more articles for one member of the family.

Visitors should have no misgivings about facilities for obtaining Canadian currency. All the banks in Montreal, and indeed all hotels, are most happy to extend this service without delay or formality, in accordance with the current rate of exchange.

Victoria Square is just off St. James Street, the Wall Street of Montreal. In the center stands a large monument to Queen Victoria.

To Fete AES Ladies at Montreal

A distinction of AES conventions through the years has been the recognition of the importance of the members' ladies and the emphasis placed upon their comfort and enjoyment.

The Montreal convention at the Sheraton-Mount Royal, June 16 to 20, 1957 is not only following suit but is also making an earnest effort to outstrip its predecessors in its effort to please the ladies. An alert and articulate Ladies Committee has already gone into action in their behalf.

The Ladies Committee, fresh from one of their frequent committee meetings at the Mount Royal Hotel, recently advised the convention's publicity chairman that it was brimming with enthusiasm over the program they have arranged. The members pointed out that, while the round of affairs will take up a sizable part of the waking hours, provisions have been made to allow for shopping and sightseeing excursions.

They suggest that the ladies bring along a pair of comfortable walking shoes since Montreal is reputed to have three of the largest and finest department stores on the Continent, as well as many unique points of interest with Old World atmosphere.

These shoes could well become the most walked about shoes in town.

Whether they buy, or just window-shop, the girls will have a wonderful time looking at Scotch woolens, English china, Irish linen, French perfume, Canadian furs, Quebec handicrafts, and many other items too numerous to mention. Many of these enter Canada under preferential tariffs, with the result that the price tags are surprisingly low.

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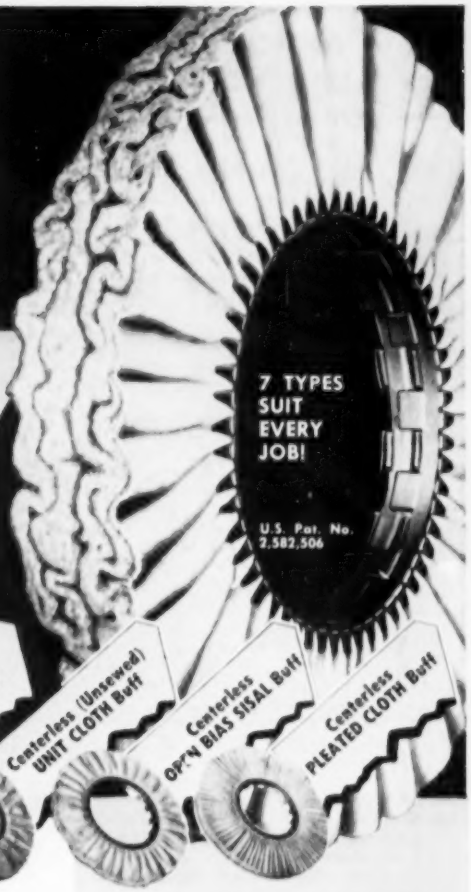

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ARTICLE REFERENCES

By
WILLIAM M. TUCKER
Eastman Kodak Co.
Rochester, N. Y.

Most of the articles listed here may be obtained by writing to the Publication. Addresses are included for the reader's convenience.

Photostat or microfilm copies of articles in available magazines may be obtained from: Library of Congress, Washington, D. C.; New York Public Library, New York; Engineering Societies' Library, New York, at prevailing rates. In other cases, consult Wilson's Union List of Serials at your nearest public library for other sources of these articles.

198. ALUMINUM

a. *SURFACE TREATMENT AND FINISHING OF LIGHT METALS. PART XII-A. PLATING ON ALUMINUM—CHEMICAL ETCHING PROCESSES.*
S. Wernick and R. Pinner.
Metal Finishing, *54*, No. 11, November 1956, p. 61–64.

199. CHROMIUM

a. *CHROMIUM PLATE IRREGULAR SURFACES UNIFORMLY.*
Louis Rosenberg.
The Iron Age, *178*, No. 20, November 15, 1956, p. 144–146.

b. *HARD CHROMIUM (Book-French).*
Publication Annuelle du Centre d'Information du Chrome Dur, Grand Palais, Porte C, Paris 8, France, 1956, 43 p.

200. CLEANING

a. *CLEANING METALS AND ALLOYS.*
C. B. F. Young.
Metal Finishing, *54*, No. 11, November 1956, p. 56–59.

201. CORROSION

a. *FINISHES TESTED BY SUN AND WEATHER.*
Ezra A. Blount.
Products Finishing, November 1956, p. 52–58.

b. *TWO-STEP PROCESS RETARDS WHITE RUST.*
L. J. Brown.
The Iron Age, *178*, No. 19, November 8, 1956, p. 106–109.

c. *LABORATORY METHOD FOR CORROSION INHIBITOR EVALUATION.*
G. A. Marsh and E. Schaschl.
Corrosion, *12*, No. 11, November 1956, p. 18–22.

202. ELECTROPLATING

a. *PRODUCTION OF SMOOTH, FINE-GRAINED ELECTRODEPOSITS. SOME THEORETICAL ASPECTS AND PRINCIPLES.*
Gunner Gabrielson.
Metal Finishing, *54*, No. 11, November 1956, p. 52–55.

203. METALLOGRAPHY

a. *METALLOGRAPHY AS AN AID TO ELECTRODEPOSITION.*
A. Conley.
Electroplating and Metal Finishing, *9*, No. 11, November 1956, p. 355–361.

204. METAL SPRAYING

a. *THE TREND OF PROTECTIVE METAL SPRAYING PRACTICE.*
W. E. Stanton.
Corrosion Technology, *3*, No. 10, October 1956, p. 311–313.

b. *SPRAYED ALUMINUM AND ZINC IN CORROSIVE ENVIRONMENTS.*
R. E. Mansford.
Corrosion Technology, *3*, No. 10, October 1956, p. 314–316.

c. *METAL SPRAYING IN THE RADIO INDUSTRY.*
C. F. Fish.
Corrosion Technology, *3*, No. 10, October 1956, p. 319–320.

d. *DEVELOPMENTS IN SPRAYED METAL COATINGS.*
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e. *METAL SPRAYING AT MESSRS. TATE AND LYLE LTD. THAMES REFINERY.*
Corrosion Technology, *3*, No. 10, October 1956, p. 323–324.

f. *METALLIZED COATINGS FOR HEAT CORROSION PROTECTION.*
J. R. Franklin.
Corrosion Technology, *3*, No. 10, October 1956, p. 326–327.

205. NICKEL PLATING

a. *"KANIGEN" CHEMICAL NICKEL PLATING.*
G. Gutzeit and E. T. Mapp.
Corrosion Technology, *3*, No. 10, October 1956, p. 331–336.

206. PLATING FROM GASES

a. *METAL DEPOSITS FROM GASES.*
C. Fred Gurnham.
Products Finishing, November 1956, p. 68–78.

207. PROTECTIVE COATINGS

a. *PREPARATION OF PROTECTIVE COATINGS BY ELECTROPHORETIC METHODS.*
A. C. Werner, B. Triffleman, D. Rothacker and N. Ross.
Vitro Laboratories (U. S. Atomic Energy Commission), KLX-10028, Jan.–Mar. 1956, 23 p.

208. QUALITY CONTROL

a. *CONTROL OF QUALITY IN METAL FINISHING.*
A. Heward.
Electroplating and Metal Finishing, *9*, No. 10, October 1956, p. 317–322.

209. SURFACE TREATMENT

a. *METAL SURFACE TREATMENT CONFERENCE.*
Electroplating and Metal Finishing, *9*, No. 10, October 1956, p. 340–346.

210. TESTING

a. *ACCELERATED TESTING OF METALLIC SURFACES. THE SALT SPRAY TEST AND ITS MODIFICATIONS.*
Wardley D. McMaster.
Metal Finishing, *54*, No. 11, November 1956, p. 48–51.

211. WASTE DISPOSAL

a. *RECOVER THAT PLATING WASTE.*
E. W. Neben.
Products Finishing, November 1956, p. 36–40.

The following are abstracts taken from the Journal of the Institute of Metals, August 1956:

Electrolytic Tin-Plating of Steel Sheet from Chloride Solutions. V. P. Kochergin, T. A. Nimvitskaya and M. Ya. V'yunova (Zhur. Priklad. Khim., 1956, 29, (1), 59–63)—(In Russian). The direct compensation method (Loshkarev et al., Zhur. Fiz. Khim., 1939, 9, 1412) was used to investigate the effect of addition of phenol, x- and β-naphthol, phenol-sulphonic acid, -naphthylamine, thioguanidine, p-toluidine, x-aminopyridine, p-aminophenol, diphenylamine, isopropylamine, ethylenediamine, urotropine and camphor on the polarization curves for baths containing either $SnCl_2$ 25, NaCl 5, HCl 10, glue 2–3 g/l, or $SnCl_2$ 50, NaCl 10, HCl 10, glue 2–3 g/l at 20° C. Addition of phenol or x- or β-naphthol, unlike the amino compounds, caused an appreciable increase in the cathode potential. The Sn deposits from the chloride deposits were dendritic or spongy, but on simultaneous addition of phenol and x- or β-naphthol, compact deposits were obtained. The deposits were flow-brightened in a vertical tube furnace at 650°–700° C, using a flux containing $ZnCl_2$ 50, NH_4Cl 16 g/l, and <1 second after the appearance of the "mirror" were quenched in water; on the majority of the specimens drops of various sizes were formed. The formation of drops increased with increasing deposit thickness and were also more noticeable with dendritic or spongy deposits. However, it could be prevented by first treating the cold-rolled steel sheet for 1–2 seconds in a bath containing $Na_2SnO_3 . 3H_2O$ 110, NaOH 10, CH_3COONa 10 g/l at 75° C and 1–2 amp/dm² before deposition from the chloride bath. The corrosion-resistance of the tinplate will be best when the $FeSn_2$ content of the coating is least, i.e. when the height of the "mirror" of fused Sn is a minimum. The recommended plating process is 1–2 seconds at 75° C and 1–2 amp/dm² in a bath containing $Na_2SnO_3 . 3H_2O$ 45–55, NaOH 9–11.5 g/l, followed by deposition at 15–20 amp/dm² and 20° C from a bath containing $SnCl_2$ 50–57, NaCl 10, HCl 12–18, glue 3, phenol 20, x-naphthol 0.1 g/l.

The Surface Treatment of Aluminum and Its Alloys. I. Machine Polishing. Charles Etienne and François Flusin (Rev. Aluminium, 1955, (224), 821–830; (225), 921–931)—A comprehensive and practical treatise on all aspects of the machining, rough grinding and final polishing and burnishing of Al finished parts, mainly castings, sections and sheet. A number of polishing heads and automatic polishing machines are illustrated, with some notes on the most suitable ways of handling various shapes of articles to obtain the best results. Mention is also made of satin-finishing and engine turning, but no details are given. The whole treatise is well illustrated.

Developments in the Field of Chemical Brightening of Aluminum (and Aluminum-Magnesium Alloys). R. Lattey and H. Neunzig (Metalloberfläche, 1955 (A), 9, (7), 97–103).—A report of a study of the reflectivities of commercial-grade Al, Raffinal (super-purity Al), and Reflectal (Raffinal +0.6, 1.0 or 2.0 per cent Mg) by the Alupol and Erftwerk processes, with

and without subsequent anodix oxidation by the Eloxal processes. Bath composition: (1) Alupol IV and V—these high-viscosity baths operate at ~105° C and immersion times of 1–2 minutes for new solution, increasing to 10–15 minutes as the solution ages; they contain H_3PO_4 (d, 1.7), H_2SO_4 (d, 1.84), fuming HNO_3 (d, 1.52), crystal H_3BO_3, and crystal $Cu(NO_3)_2$ in the following amounts: 53.0, 41.6, 4.5, 0.4, 0.5 weight-per cent, respectively, for Alupol IV; 77.5, 15.5, 6.0, 0.5, 0.5 weight-per cent respectively, together with ~0.05 per cent carboxymethyl cellulose (as wetting agent), for Alupol V; (2) Erftwerk—a low-viscosity bath operating at 45°–65° C with immersion times of 15–30 seconds, contains HNO_3 13 and NH_4HF_2 16 weight-per cent. The results, which are presented and discussed in detail, show that the Erftwerk process is the better for brightening Raffinal and Reflectal, whereas the Alupol process—especially Alupol V—is superior for normal commercial grade Al and its alloys. The Alupol process is the easier to control, but material losses are high, as the viscous solution does not drain easily from the surfaces of the articles and, therefore, large quantities are lost in the wash waters. 11 ref.

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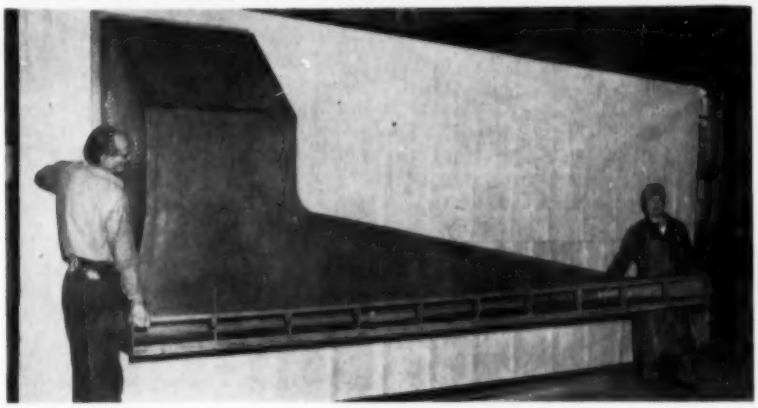

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Easy low cost installation of Haveg polyester glass fume duct, hoods, fans and fume fittings assure positive removal of corrosive process fumes and gases. Excellent machining and molding properties permit ready fabrication of complete systems or replacement units for deteriorated apparatus in existing ventilator lines, gas distribution systems or similar applications handling corrosive fumes up to 350°F.

Whatever your fume removal problem, there's a Haveg plastic to provide the most efficient and economical system to meet your requirements. Fume stacks and ducts from 6 inches to 12 feet in diameter and over 200 feet high may be flanged for quick assembly in the field—or resin-welded in a single unit! Haveg fume systems require only minimum support, are completely unaffected by the most extreme weather or climate conditions! Discuss your fume removal problems with a Haveg engineer, or write for Bulletin F-7.

LIGHTWEIGHT POLYESTER GLASS TANKS OFFER UNUSUAL ADVANTAGES

Lightweight, low cost fiberglass reinforced polyester plating and process tanks are now available at Haveg Industries' new Pla-Tank manufacturing division. Production of the new tanks augments the complete Haveg line of reinforced plastic tanks for every process application where superior corrosion resistance is required. Production economies of polyester glass tanks and other process equipment permit installation costs considerably below those for conventional lead or rubber-lined, stainless steel—and even mild steel equipment in many instances! Unusual light weight of the plastic tanks provides bonus savings in reduced steel requirements for foundations and supports—easier installation and longer, maintenance-free service.

Haveg 7710 Polyester Glass is strong and tough. Its exceptional resistance to acids, hypochlorites, salts, alkalies, and various oxidizing agents—at process temperatures up to the boiling point assures that maximum strength and durability under the most extreme corrosive acids. Other Haveg plastic equipment provides operating temperatures to 350°F with equal or superior corrosion resistance.

If you plan a new or replacement tank installation, investigate first the outstanding cost and service advantages of Haveg polyester glass and other types of Haveg process equipment. Haveg Bulletin C-13 will give you details of the complete line of Haveg corrosion resistant equipment for process use, Bulletin G-10 describes Haveg polyester glass equipment . . . or ask to have a qualified Haveg corrosion control engineer call without obligation. His recommendations may be the start of major savings.

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AES NEWS

Editorial Board Meets in Montreal

The Editorial Board when it meets at the Mount Royal Hotel in Montreal January 18 expects to review the abstracts of over twenty technical papers that have been marshaled for its consideration by Philip M. Coady, Educational Sessions chairman of the 1957 Montreal Convention, and his associates.

Featuring five single educational sessions instead of five dual sessions as in Washington in 1956, the Montreal Convention will concentrate both on versatility and quality.

Aside from harnessing the 1957 educational sessions, the Board will also consider the awaited report of its Paper Awards Appraisal Committee headed by Past President Arthur W. Logozzo.

Expected at the meeting besides AES President Samuel Heiman, Board Chairman John P. Nichols, Secretary Rodney Leeds and Educational Chairman Coady will be Dr. Abner Brenner, John B. Capuano, S. Lewis Doughty, Dr. Russel E. Harr, Arthur W. Logozzo, Howard J. McAleer, Robert D. Miller, Fremont L. Scott, William M. Tucker and Dr. Harold J. Wiesner.

Feature Issue on Agenda

The prospect of a Research Issue of PLATING will be among the many subjects on the Agenda of the Society's Research Committee when that body convenes in regular session at the Conrad Hilton Hotel, Chicago, on Friday, January 25, 1957 with Chairman Arthur H. Du Rose presiding.

Members expected include Vice Chairmen Robert A. Ehrhardt and A. P. Wrisberg, plus George E. Best, Leslie Dively, Lloyd O. Gilbert, Dr. Russel E. Harr, Dr. Walter R. Meyer, Leland M. Morse, Dr. William Blum and John P. Nichols, secretary-treasurer.

Manual Ready Soon

Beside the Society's well-accepted 1956 edition of TECHNICAL PROCEEDINGS, another AES book that made its appearance recently is the 1956 edition of BUSINESS PROCEEDINGS. Each Delegate and Alternate of the Supreme Society, each member of the Executive Board and each Branch President and Branch Secretary received a copy.

The AES's vaunted BRANCH OFFICERS MANUAL will soon make its debut in consolidated mimeographed looseleaf book form. Copies will go forward to all Branches that ordered them. A limited number of extras will also be available for the accommodation of those Branches that did not heretofore order copies.

These will be available to Branches *only*, on strictly a first-come, first-served basis so long as the Society's limited extra quantity lasts, at a cost of $5.50 per copy.

National Officers at Detroit

National officers present at the recent outstanding Annual Banquet of the AES's Detroit Branch included Dr. Samuel Heiman, president; Francis T. Eddy, first vice president; Herberth E. Head, second vice president; Ralph D. Wysong, third vice president and John P. Nichols, national executive secretary.

Vistors at Headquarters

Recent visitors welcomed to National Headquarters were Past Presidents Franklyn J. MacStoker and George Wagner. Both are among the Society's 18 living Honorary Members.

New Sustaining Members

Two new names appear on the roster of Sustaining Members of the AES. The new Sustaining Members are: Siefen Compounds, Inc., 14325 Wisconsin, Detroit 38, Mich. and American Metal Finishing Co., Canton, Miss.

Research Aid by Two Branches

National Headquarters' attention recently was particularly called to a special voluntary contribution to the Society's Research Fund by the Western Ontario Branch. "As you can see from your records," wrote Kergan Wells, who handles Research Committee banking in Canada, "the Western Ontario Branch has a very small membership and this amount from their Branch funds represents a contribution of about $3 per member. They are very proud of it. . . . . "

Headquarters knows, too, of a $100 contribution to the same important Research Fund by the Society's Central-Michigan Branch.

To each of these dedicated and generous smaller Branches, the Society extends its compliments and its deep appreciation.

Western Ontario Completes History

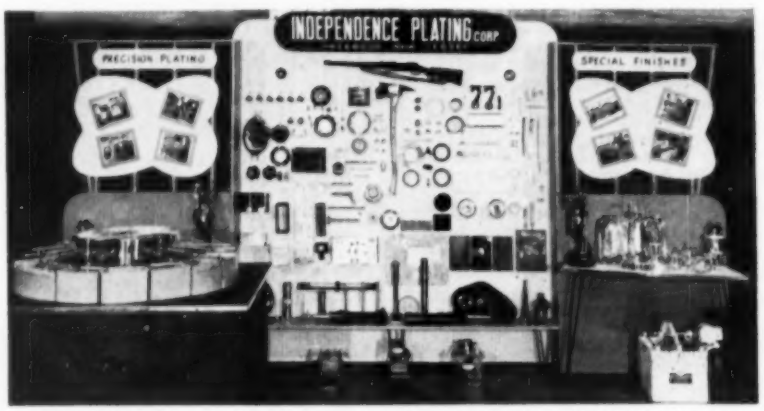
Western Ontario has completed its Branch History from its inception in 1948 and continuing on through 1955.

Western Ontario's permanent charter was granted in October 1949.

NATIONAL HEADQUARTERS PERSONNEL

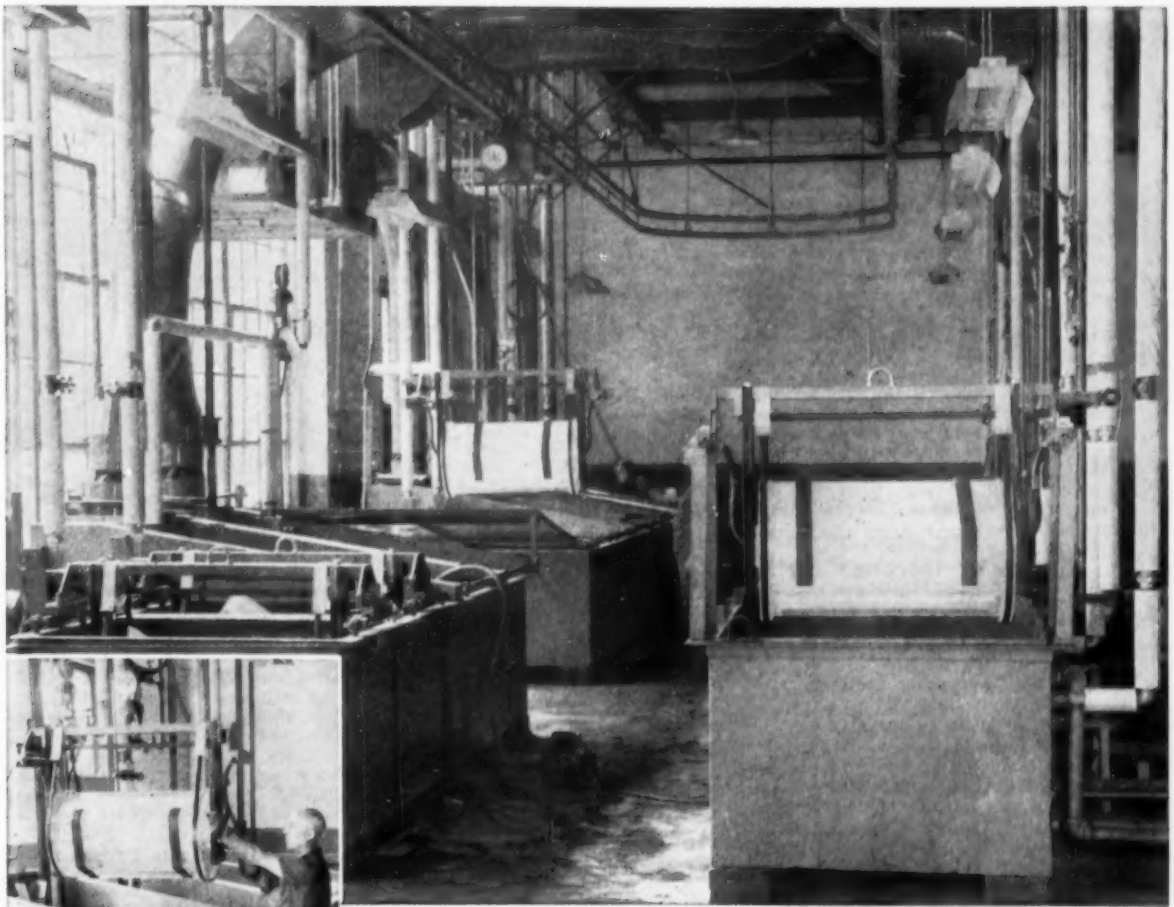
Miss Marie Citarella

Financial right arm of the National Executive Secretary, Miss Citarella is the long-time Accountant at National Headquarters. Bookkeeping, billing, disbursing, purchasing, banking are among her jobs.



Independence Plating Corp. was the only plating company to exhibit at the Paterson, N. J. Cavalcade of Progress, November 27 to December 1. President Corado Corsini and his staff showed the many industrial and decorative finishes furnished by this job shop of 70 employees and 7 AES members. The show itself consisted of exhibits of the many products and services characteristic of Greater Paterson industry and the aisles to the Independence exhibit, featuring a model full automatic copper-nickel plating conveyor, were jammed for hours at a time by eager visitors anxious to obtain bright nickel plated medallions coming off the conveyor.

Electric Auto-Lite adds more Proof...



that G-S means Greater Savings!

New G-S Belt Drive Barrel Installation Streamlines Syracuse Division of The Electric Auto-Lite Company

A smoother operation was the immediate result of putting in the complete "through-cycle" line of G-S Belt-Drive Plating Barrels with Loader, Unloader and Driers in the Syracuse Division of The Electric Auto-Lite Company. Plating is faster and better quality.

Electric Auto-Lite typical of all G-S installations!

New G-S "Cogged-V-Belt" Drive Plating Barrels outperform them all. Larger loads, faster, better plating at higher current densities. "Through-cycle" service and larger trouble-free equipment life with no down-time. Exclusive "Cogged-V-Belts" and cogged drive pulleys constant meshed for positive power transmission without gears. Cogged-V-Belts steel tensile members won't stretch. "Locking-U-Hubs"—danglers angled down through hubs won't "ride" up on load. Quick, easy changing of cylinder and danglers saves hours. Adjustable Bearings, Floating End Plates for constant contact. Total Cylinder immersion prevents explosions. Cylinders of H-T Sincolite or Tempron (hard rubber) fusion-welded, heavy-ribbed construction. **G-S equipped platers get bigger returns per investment.** Check into the G-S Conversion Plan. It costs less than you think and pays for itself in savings.

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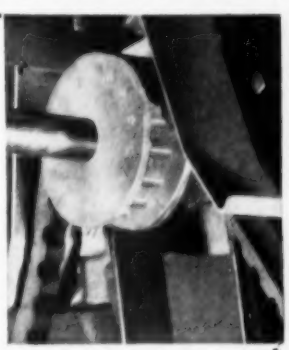

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Clark Suffers Attack

Royal F. Clark Sr., a Charter Member of the AES since 1909 and an Honorary Member of the Newark Branch recently suffered a heart attack while walking with his wife to his garage. He was rushed to Martland Medical Center, Newark, and from latest word is convalescing satisfactorily.

Royal has served as president, vice president and secretary of the Newark Branch. He was a foreman and supervisor of electroplating for 53 consecutive years—from 1900 to his retirement in 1953. In May 1956, Mr. and Mrs. Clark celebrated their 53rd wedding anniversary.

Van Derau Honored by Ohio Chambers

Past President Clarence Van Derau, general works manager, Westinghouse Electric Company, Dayton, and one of AES's eighteen living Honorary Members, recently became the fourth man in the entire nearly half-century history of the Mansfield (Ohio) Chamber of Commerce to be voted to Honorary Life Membership on that Chamber's Board of Directors. In addition to this signal honor culminating his nearly two-decade service on that Chamber's Board, he was also recently elected a Life Member of the Ohio Chamber of Commerce itself.

Mr. Van Derau's tenure as president of the AES occurred in 1933 and 1934, during the nation's most drastic economic depression. A member of the Society's Dayton Branch, he is also an Honorary Member of that AES affiliate.

EDWARD T. HOMAN

Edward T. Homan, 79, died in early November. He had been an Honorary Member of Philadelphia Branch since May 1950, and had been a member of that Branch for more than 41 years. A resident of Collingswood, N. J., Mr. Homan was with Frederic B. Stevens Inc., at the time of his retirement.

JOHN J. HANEY

John J. Hanney, 57, a past president of Grand Rapids Branch, died of a heart attack on November 24 while on a hunting trip in northern Michigan.

'Jack' Hanney, as he was familiarly known throughout the AES, had served in every elective post in his Branch which he joined over 20 years ago.

Sales representative for Metal & Thermit Corp., he joined United Chromium, Inc., a former subsidiary of Metal & Thermit, in 1944. He had earned a number of awards for outstanding salesmanship and had helped train and develop junior salesmen.

His wife, a daughter and five grandchildren survive.

One Dip! One Powder!

New Powders Give *Economical* One-Dip Brightening

Three unique, easily handled *low cost* powders each providing bright finishing in a *single dip* operation are available for both zinc and cadmium plate.

Kenvert No. 16 produces mirror-bright, iridescent-free surfaces on zinc plate with *NO BRIGHTENERS* in the bath and offers savings up to 50% over previous methods.

Kenvert No. 17 (or 17a for automatic cycles) is specifically designed for bright dipping of bright plated zinc work and yields a clear or BLUISH SHEEN color after hot rinsing.

Kenvert No. 27 provides passivation and some brightening on cadmium plated surfaces where brighteners are used in the bath. The result is a clear white metallic color without the yellowish hues usually associated with chromic acid bright dip treatments.

All of these powders give excellent corrosion protection and resistance to staining and finger printing, and are packaged in disposable steel or fiber drums.

None of these processes requires special ventilation of any kind, and all operate satisfactorily in room temperature ranges. These single dip processes are excellent for use in facilities which have limited or unavailable tank space after plating.

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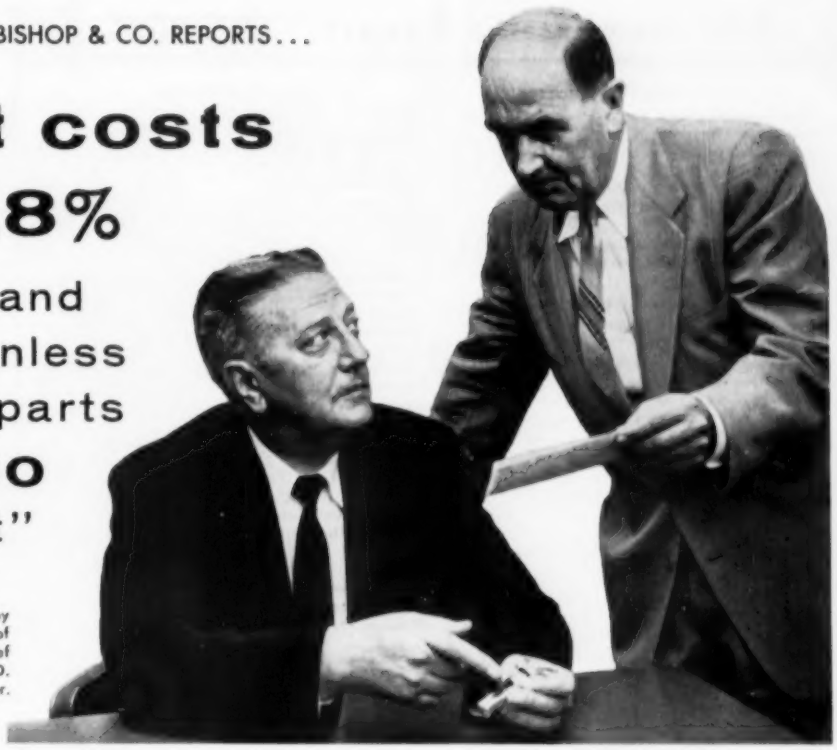
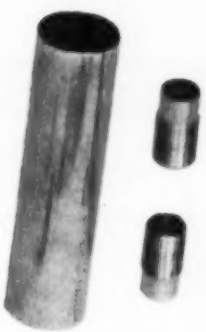
"We cut costs 98.8%

by deburring and polishing stainless steel tubular parts with ALMCO equipment"



SAVINGS OF $6,917.50 PER YEAR by controlled barrel finishing is the topic of discussion between J. H. Gettig, Chief Engineer of J. Bishop and Co., and O. D. Ladley, Almco Eastern Branch Manager.



HALF A MILLION delicate parts for recording instruments and fountain pens are deburred and polished each year at J. Bishop & Company of Malvern, Pennsylvania. Each must meet rigid requirements in uniformity of size, smoothness and high polish.

A costly process? Yes, when you consider the way Bishop used to finish them by machine reaming, hand scrapers, wire brushes and belt polishers.

Today this plant uses an Almco Model DB-200 finishing barrel, which gives three important advantages: (1) High volume, low cost deburring and finishing, (2) precise control during finishing process, (3) product improvement.

Here's how controlled barrel finishing worked out for J. Bishop & Company. They cut finishing costs by 98.8% ... practically eliminated rejects ... raised average output from 200 parts to 6000 parts per hour. Cost per unit for finishing has been cut from .014¢ to .00016¢. Annual savings total $6,917.50.

Chief Engineer J. H. Gettig sums it up this way, *"Our decrease in costs and our product improvement leaves no basis for comparison."*

PART OF A HALF MILLION ANNUAL OUTPUT, this batch of delicate instrument parts is being run in an Almco DB-200 barrel finishing machine.

Almco equipment is also used throughout the world for descaling, grinding, work-hardening, rust-inhibiting and other deburring and finishing operations. Equipment is available for small and large parts, high or low volume work. Each is designed to handle ultra-low microinch surfaces and close tolerance radii.

LEARN HOW MODERN BARREL FINISHING CAN IMPROVE YOUR PRODUCT

Almco's new, technician-staffed lab in Albert Lea, Minnesota can help you with your product parts. We will examine your product parts, run them through tests, and come up with the answers you want. For example — where you can save finishing costs, how you can improve product quality and appearance, what method is best for your operation.

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52 pages of facts and processes on barrel finishing. Shows typical installations, how to select the proper finishing barrel. Includes detailed cost chart on finishing of typical parts. Send for your free copy today.

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Total AES Membership December 1, 1956—7308

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Central Michigan: C. L. Welch
Dayton: W. J. Curry
Detroit: J. M. Clontz, J. Jurich, D. F. Liphardt, Z. J. Majzoub, J. P. Meloche, L. P. Wroblewski
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Milwaukee: J. Fenske, L. C. Host
Mississippi Valley: M. Brunning, V. N. Holgren
Montreal: B. S. Jacobs, E. Ladouceur, E. Papineau, E. J. Petry, F. Sylvain, C. W. Wagner
Newark: A. P. Ellsworth, Jr., R. T. Groom, A. A. Latawiec, W. G. McBurney, Jr., D. Philipse, K. Rau, G. A. Ross, H. T. Yum
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Rochester: R. L. McCrae
Rockford: J. A. Gabrielson, R. Johnson, C. Miller
St. Joseph Valley: R. H. Clarkson, G. T. Keeley
Seattle-Puget Sound: C. W. Ireland, D. G. Kelly
Southeastern: M. M. Randman
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Toronto: H. B. Baka, L. D. Bettridge, C. Jones, A. Murray, P. C. Noy, W. J. Robinson
Waterbury: B. Sullivan
Western Ontario: F. G. Atfield, J. O. Kelly
Wichita: H. Ostadeen, J. L. Pake
Member-at-Large: J. E. Castro, Monterrey, Mexico

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Houston: D. W. Lackey
Los Angeles: R. C. Berry
Montreal: K. B. Lane
Rochester: E. J. Beaudry
Syracuse: M. T. Lawlor

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Allentown-Reading: L. Wotring to Cleveland
Columbus: C. Kayser from Cincinnati
Houston: D. E. Chapman from Rockford
Indianapolis: F. Liffick to Milwaukee
Los Angeles: R. F. Rathburn from Detroit
Milwaukee: J. H. Berg to Mississippi
Mississippi: J. H. Berg from Milwaukee
Providence-Attleboro: R. L. Mitchell to Waterbury
Twin City: J. E. Anderson to Los Angeles, R. Byron to Chicago

RESIGNATIONS

Baltimore-Washington: Mrs. M. A. Hilkert
Central Michigan: R. H. Hoff, E. J. LeMieux
Detroit: N. L. Brisendine
Houston: C. A. Matizza
Indianapolis: H. J. Carter
Seattle-Puget Sound: J. C. Corl
Toronto: J. R. Berry

SUSPENSIONS

St. Joseph Valley: G. Stahl
Waterbury: J. C. LaGambina, S. L. Longo

DEATHS

Bridgeport: H. G. Rice
Los Angeles: G. W. Shomin
Montreal: G. Bloxall

ERRATA
TECHNICAL PROCEEDINGS

A printing error regretfully occurred in the Dr. Otto Kardos paper, "*Current Distribution on Microprofiles II*," page 184, Technical Proceedings, 1956 Edition. The corrected Equation XV is:

$$\delta = 3.33 \left(\frac{\nu D \rho x}{g \Delta \rho} \right)^{1/4}$$

The illustrations for two of the figures in the paper "*A Study of Phosphate Treatment of Metals*" by Lloyd O. Gilbert are transposed on page 201. The illustration in Fig. 27 is the picture for Fig. 29 and vice versa.

MAIL BOX—

DEAR SIR:

Re: *Mailbox, Plating, Sept. 1956.*

I just want to say that I find Brenner and Ogburn's point on separating the registration for the AES Conventions and for the closing dinner very well taken, and I think everybody will profit by such an arrangement.

Truly yours,
KARL NELL
Rochester, N. Y.

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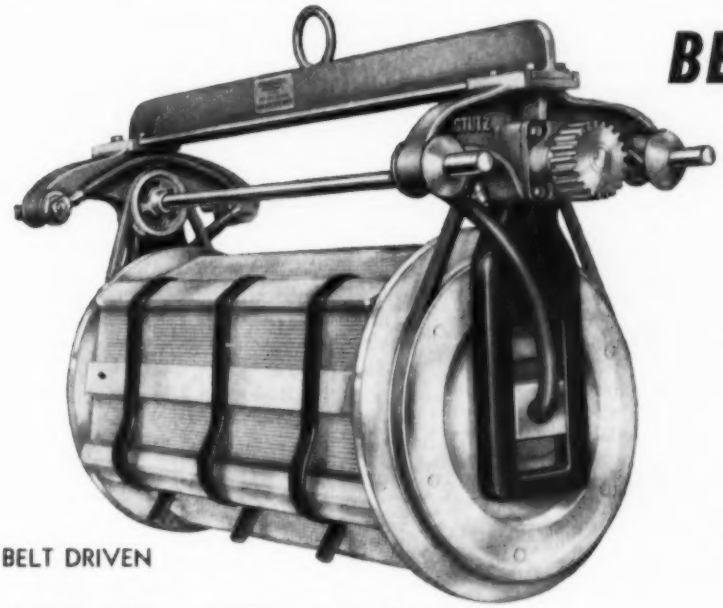

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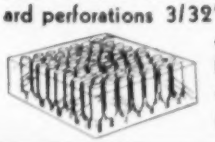

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Patent Pending Case # 5047

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SAUBESTRE REPORTS Committee B-8 Meeting

The American Society for Testing Materials Committee B-8 on Electrodeposited Metallic Coatings and its five working subcommittees met in the Benjamin Franklin Hotel, Philadelphia, on October 18-19. The meetings were attended by about 60 members and guests. The following report was made for PLATING by Dr. E. B. Saubestre of the Chemistry Laboratory of Sylvania Electric Products Inc.

Subcommittee I (Definitions) Chairman: F. Ogburn. Section A on "Nickel and Nickel Alloys Deposited by Chemical Reduction from Aqueous Solutions," under W. Moline of National Cash Register Co., is planning to write a monograph which will bring together currently available information on electroless nickel.

Subcommittee II (Performance Tests) Chairman: W. L. Pinner. An inspection of the program 4 panels (copper-nickel-chromium) at Kure Beach were to be made November 12. The report of Section C on conversion coatings was delayed to the meeting of Subcommittee V.

Dr. Lowenheim reported for Section D, which is investigating a new corrosion rating system. This method involves assigning two rating numbers to each panel. One number describes the protection afforded by the plated coating to the basis metal, the other describes the condition of the coating itself as far as its extent of deterioration and appearance are concerned. The system was first successfully used in May. The following categories were included in the factors describing protection of the basis metal exclusively: pinhole rusting, crater rusting, rust stain. For describing coating deterioration or appearance, the following factors are involved: surface pitting, crazing, crow's feet. Blistering, peeling and flaking may belong to either category.

Dr. Lowenheim also reported for Section E, which is concerned with tin and tin alloy coatings. He reported that this group will conduct wettability type solder tests on receipt of suitable equipment. J. T. Irwin, chairman of a task group investigating white brass undercoats, submitted a report concluding that evaluation of such deposits is not in the best interests of ASTM at this time. The chairman then dissolved the group with thanks. Mr. Kerstetter, chairman of a task group on plated coatings on aluminum, indicated that a program of proposed action will be submitted at the next meeting.

Subcommittee III (Conformance Tests) Chairman: R. F. Ledford. Walter Moline, chairman of Section A on thickness measurements, reported on the results of an industry survey on chromium plating thickness measurements. Chemical drop tests were found to be most widely used. Results of such tests were found to be erratic for chromium over copper. For chromium over stainless steel, addition of antimony oxide to the reagent is required. Acceptable alternative methods include stripping, electrochemical methods, and use of a micrometer (for heavy coatings). It was voted to make these comments an amendment to A-219-54, and submit to Subcommittee I for action.

Dr. M. M. Beckwith reported for Section C on hardness tests. Data previously gathered for nickel and copper have shown little correlation to date. Further analysis of the data is planned prior to the next meeting. Myron Diggin reported for a subgroup of Section C on ductility tests. He submitted a paper written by W. L. Pinner and L. M. Morse covering the present status of the art. He also drew attention to an article in the August 1956 issue of Electroplating covering British practice. The report of Messrs.

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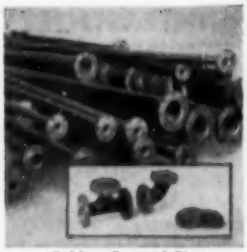
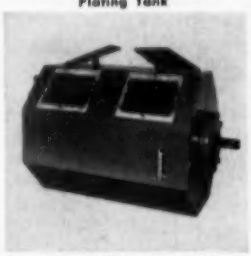


Rubber Covered Pipe and Fittings

Rubber Lined Diaphragm Plating Tank

ARco Rubber Lined "Handy-Tanks"



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Pinner and Morse will be circularized to the Subcommittee.

Fielding Ogburn reported for Section E on adhesion. He stated that his group favors adding a footnote to ASTM adhesion specifications to comment on Federal Specifications such as bend tests. No final action was taken on the proposal.

Subcommittee IV (Electroplating Practice) Chairman: M. Frager. Section J (Preparation of Malleable and Gray Iron for Electroplating), chairmanned by Jim Lansing had submitted a proposed recommended practice to letter ballot of Subcommittee IV. After discussion, a number of technical and editorial changes were made, and the proposed recommended practice was submitted to B-8 for letter balloting.

The proposed recommended practice of Section K (Cleaning of Metals for Electroplating) had been submitted to letter ballot of Subcommittee IV. It was voted to return the report to the Section for further technical and editorial changes.

Henry Kafarski, chairman of Section W (Industrial Water for Electroplating), reported that his group had met and begun to formulate their plans. They have subdivided their work based on the process for which the water is to be used. The problem first will be to determine impurity limits for the process, then to determine corresponding limits for the water used in the process.

A task group had been formed at the last meeting, headed by F. Nagley, to determine the extent of interest in double nickel coatings (i.e., copper-nickel-buff-nickel-chrome). A lively discussion indicated industrial interest in double nickel coatings is high, and that data on such coatings are now becoming available in increasing amount. As a result, Max Frager appointed a six-man task group to investigate the problem further, and will appoint a chairman at a later date.

An NAMF reorganizational meeting was held at Hampton Court Hotel, Brookline, Mass. recently with about 2 dozen participants. Above (left to right, seated) AES National Past President, Dr. George P. Swift, Boston; NAMF 2nd Vice President Webster B. Knight, Detroit; Bruce E. Warner, Worcester; NAMF Nickel Committee Chairman Mariano Ranno, Brooklyn. Standing, NAMF National Past President William F. Walton, Attleboro and NAMF Assistant Secretary-Treasurer Sal Novelli.

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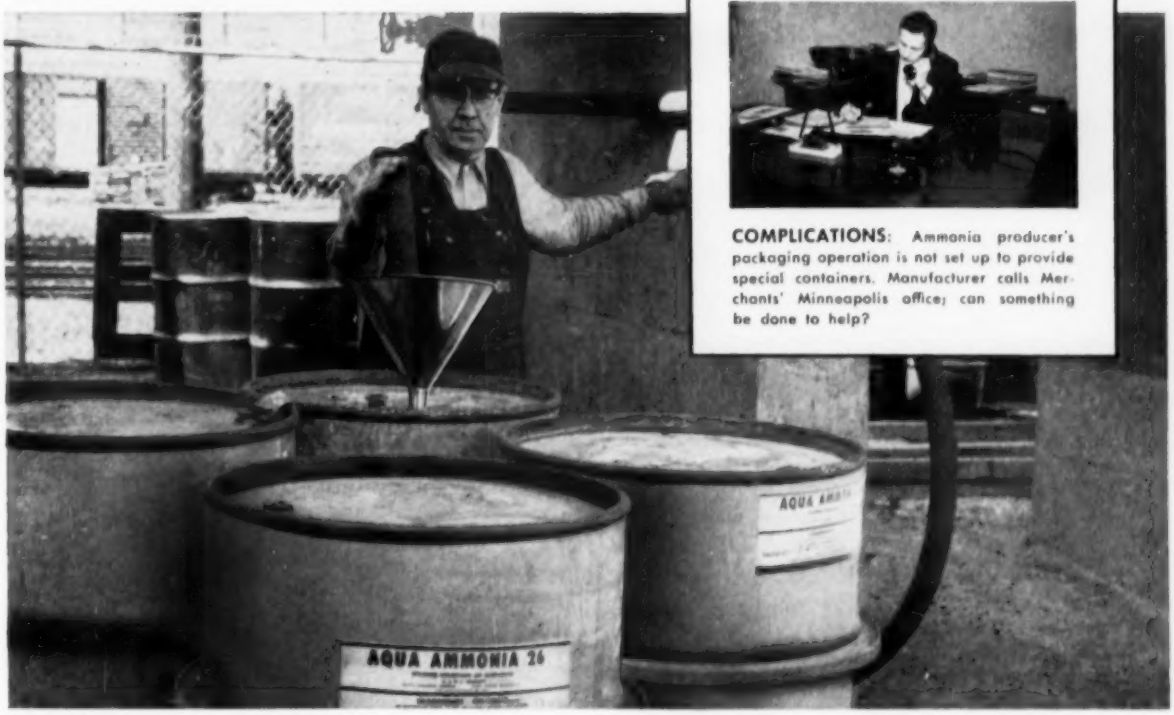
COMPLICATIONS: Ammonia producer's packaging operation is not set up to provide special containers. Manufacturer calls Merchants' Minneapolis office; can something be done to help?



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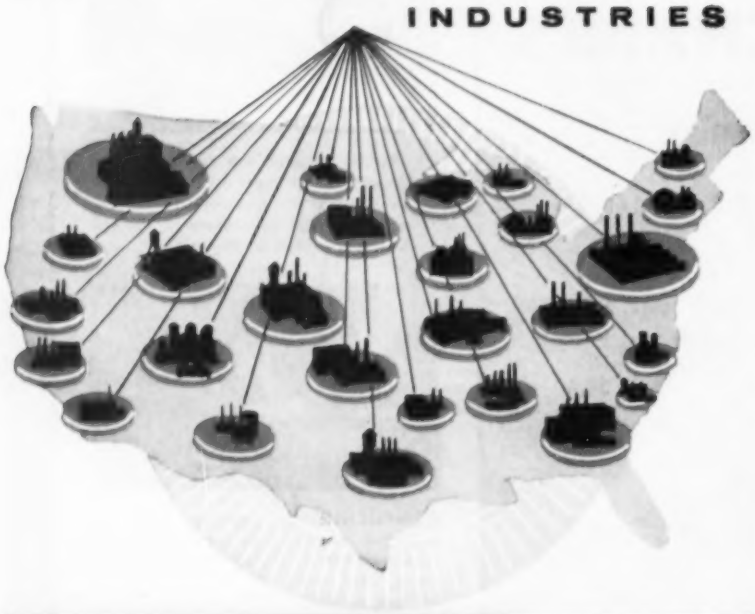

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INTERSOCIETY NEWS

(Continued from page 82)

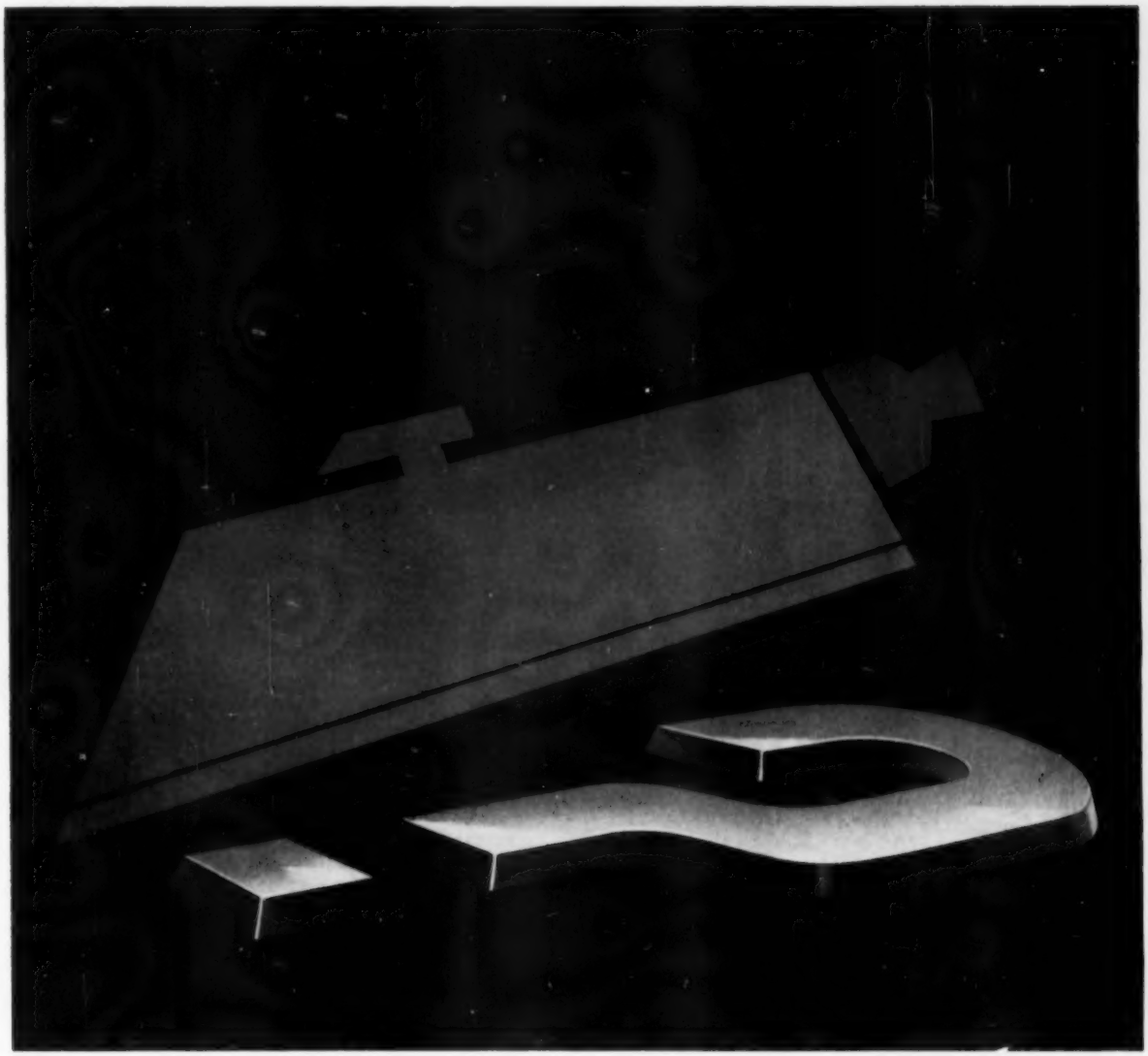
Subcommittee V (Supplementary Treatments for Metallic Coatings) Chairman: M. Darrin. Mr. Nagley reported for Section B on chromate treated zinc. Corrosion studies are indicating that hexavalent chromium content appears to influence the life expectancy of the coatings. W. L. Pinner spoke for L. Gilbert, chairman of Section D on cadmium treatments. A variety of panels had been previously prepared for exposure on corrosion test racks in various locations. For various reasons, this has not yet been done, but it is hoped to begin the testing program shortly.

Section E (Phosphate Treatments) has completed a paper to be presented for publication in the ASTM Bulletin. Experimental studies to be made by the section will include outdoor exposure and salt fog corrosion tests, and coating structure studies using faxfilm and X-ray diffraction techniques.

Chairman F. L. Scott reported on the work of Section F (Organic Finishes). He stated that a recommended practice for clear organic coatings on chromium deposits has been prepared, and would be submitted for letter balloting to Subcommittee V. The question of chromate conversion coating treatments on aluminum was again raised. Consensus is that jurisdiction lies in B-7. Therefore, it was voted that instead of having work originate in B-8, that B-7 be requested to supply its specifications on anodizing aluminum and magnesium to Committee B-8, for inclusion in the latter's book of specifications for electrodeposited coatings.

R. E. Harr and E. C. Bertuccio showed colored slides of chromated zinc panels now undergoing corrosion test at Kure Beach.

Committee B-8 Chairman: C. H. Sample. It was announced that ASTM Committee B-8 Specifications, Recommended Practices, and Methods of Test were accepted as ASA Standards on August 22, 1956. G. Lux was appointed as representative of Committee B-8 on D-12, replacing S. Spring. Arthur DuRose was appointed as representative of B-8 on Subcommittee 16 of Committee E-1. It was also announced that the Recommended Practice for the Preparation of Lead and Lead Alloys for Electroplating has been approved by letter ballot in Committee B-8. This recommended practice will now go to ASTM for final approval.



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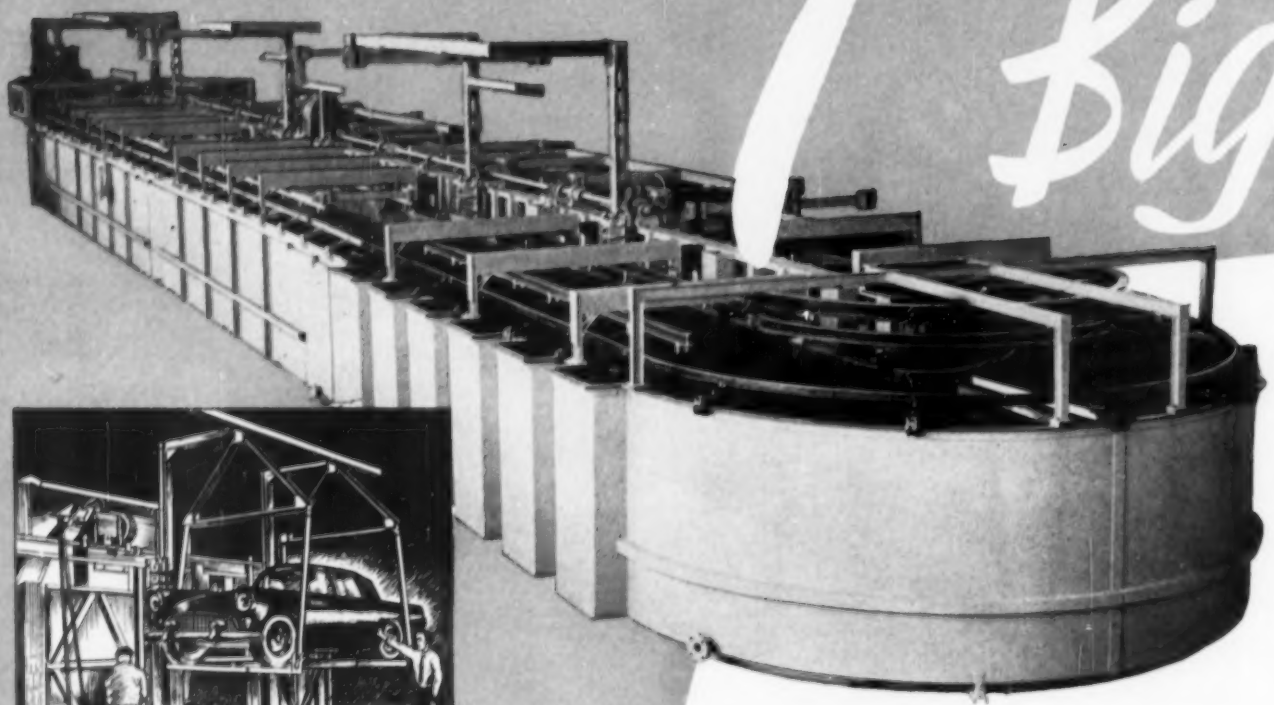

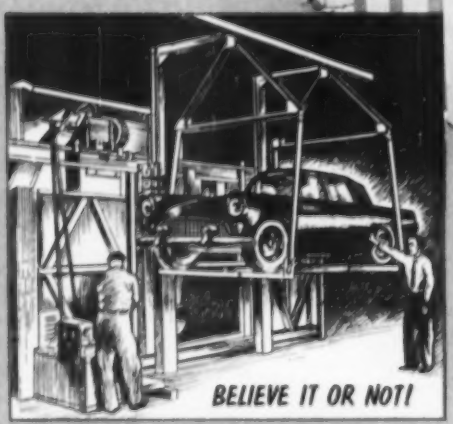

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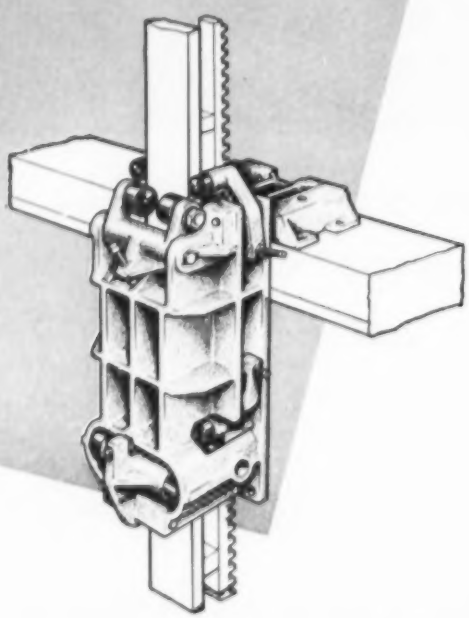

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BRANCH NEWS

Total AES Branches U. S., Canada, Australia, December 1, 1956—57.

BALTIMORE-WASHINGTON
McLaughlin Speaks on Coated Abrasives

The November meeting of the Baltimore-Washington branch was held in the Chemistry Lecture Room in the Chemistry Building at the National Bureau of Standards, Washington, D. C., with president **Horelick** presiding.

After a very short order of business president Horelick introduced the speaker of the evening, **J. K. McLaughlin** of the Behr-Manning Co.

Mr. McLaughlin began his subject, "New Applications and Design in the Field of Coated Abrasives," with a general introduction and a brief history of the field of coated abrasives.

He then pointed out how we, as individuals, were often affected by increases in production of many products used in our daily lives, where coated abrasive belts have replaced older methods.

He discussed many of the newer developments in the application of abrasives and prophesied of many to come.

Two color-and-sound movies were used to illustrate his very interesting subject.

At the conclusion he presented each person present with two booklets: "How to Sharpen" and "Coated Abrasive Metalworking Production Progress."

BRIDGEPORT
Report on Regional; Resolutions Passed

The regularly scheduled business meeting and educational session of the Bridgeport Branch AES was held in the main ballroom of the Hotel Barnum on Friday, Nov. 9, 1956. President **Bonazzo** called the meeting to order; 42 members and guests.

One new member was accepted and an application received for membership.

F. Tatum and **W. Lindsay** reported on activities at a recently held N. E. Regional Committee meeting. Springfield is the host branch; April 27, 1957 was tentatively selected as the date and the site would be the Hotel Statler in Hartford. The Bridgeport branch was asked to select two hostesses and to also suggest topics and speakers.

The Bridgeport branch was commended for the excellent publicity campaign it conducted through its committee headed by **Richard Barrett.** A permanent secretary for the Regional is to be selected and Bridgeport was asked to nominate a member for that office. The Branch went on record in support of **Bernard Gaffney** of the New Haven branch, or any nominee offered by New Haven.

Carl Sievert reported the death of **Howard Rice.**

In order to receive greater publicity it was suggested that photographs of recently inducted members and of planned activities be taken and presented along with the pertinent copy for inclusion in publications. Mr. Barrett offered the use of his camera for this purpose.

The National Society requested articles by members suitable for publishing in our PLATING magazine. A notice from the National President's office regarding the interim meeting to be held in Pittsburgh on Saturday, Jan. 12, 1957 provoked the passing of the following resolutions for consideration at the scheduled delegates meeting:

(1) That the Board of Governors be expanded to not less than 15 members to provide a more equitable representation of the branches and to preclude any rash action without a more considered discussion.

(2) That all delegates and alternates be provided with the transactions of the previously conducted national business meeting, and it should be forwarded to them not later than ninety days after the event.

H. Braun proposed that the Supreme Society be asked to consider submitting the names of **Walter Meyer** and **Ray O'Connor** to the convened delegates for approval of these men as National Honorary members. It was so voted. Specific information as to their qualifications and their contributions to the National will be compiled and forwarded to the Executive Secretary for processing.

Anthony Chenis won the door prize.

Mr. Combs being ill, he was replaced as the scheduled speaker by **J. B. Branciaroli** of the technical sales division of Diamond Alkali Co. Mr. Branciaroli outlined the development of chromium plating from its earliest days up to the present time, including the recently developed additive called CPA 1800. This process, as outlined by Mr. Branciaroli, affords an improved bright current density range, increased speed of plating and higher permissible current densities. An improvement on fatigue strength, on hardness characteristics and other physical properties were described. **R. G. Parker**

Secretary-Treasurer

CHICAGO
Panel on Precious Metals; Fritts of GM Speaks

The regular meeting of the Chicago Branch of the American Electroplaters' Society was held on November 9, at the Western Society of Engineers, 84 East Randolph St. A warm welcome was extended to six guests from the Rockford Branch.

An interesting question and answer period on the subject of precious metals was held. The questions were answered by a board of experts consisting of **Joe Niles** of the George A. Stutz Manufacturing Company, and **Al. Weisberg** of Technic Inc.

The speaker was **J. E. Fritts,** director of process development, Ternstedt Division of General Motors Corporation.

Before delving into the topic of the evening, "Polishing and Buffing Research at General Motors," Mr. Fritts reported on the progress of the work on Project No. 15 (accelerated corrosion tests for the performance of plated coatings). He pointed out that Test No. 20 consisting of the use of Corrodkote and exposure in a humidity cabinet at 100° F looked very promising.

He pointed out that instruments for testing mechanical assemblies are many but that those for testing plating are few. He described a group of instruments that have been designed at General Motors and are being used to evaluate buffing compounds, buffs, and to control polishing and buffing operations.

J. C. Corre

Publicity Chairman

CENTRAL MICHIGAN
Mechanical Polishing Given by Vorce

The Central Michigan Branch of the AES held their second dinner-program meeting of the year on November 13 at Hotel Hayes in Jackson, Michigan, with President **G. S. Woodruff** presiding.

Lee Vorce, of the Behr-Manning Company, talked on "Mechanical Polishing with Coated Abrasives." A color-sound movie illustrated many of the applications in this field. The presentation was followed by a discussion period and a social hour.

Earl D. Creese

Publicity Secretary

CINCINNATI
Inspection Tour

Thirty-one members of Cincinnati Branch enjoyed a pleasant buffet dinner at the Hotel Alms on November 28. After dinner the members went on an inspection tour of the Printer's Electrotype Company of Cincinnati. The tour was preceded by an interesting talk by **Gordon Speers** and a movie about the electrotyping industry.

David L. Kaplan

Secretary

COLUMBUS
Plating of Printed Circuits Heard

The regular monthly meeting of the Columbus branch AES was held at Battelle Memorial Institute on Friday, November 2.

Following a film entitled "Winter Holiday" the business meeting was called to order by President **Bill Shriver.**

Nat Koslin asked how the Columbus branch felt about closing Tri-state membership to the present cities. The group

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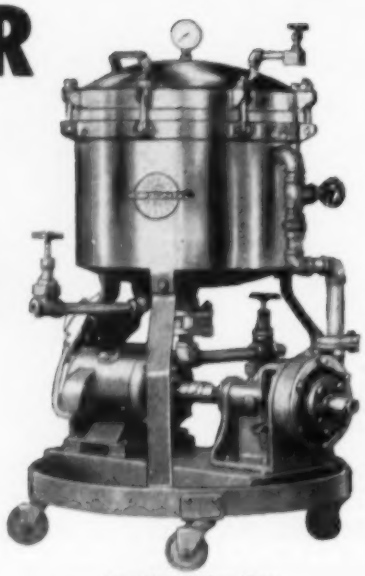

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felt it is not in a position to decide the question.

President Shriver said he would try to send one delegate to the Interim meeting at Pittsburgh on January 12, 1957.

Librarian **George Skelly** introduced the speaker of the evening, **R. Scott Modjeska** of Scientific Control Laboratories, Chicago, whose subject was "Plating Less Common Metals on Nonmetallics." Mr. Modjeska spoke interestingly on the plating of printed circuits.

Halvor Christianson
Secretary

DAYTON

Member Talks Reinstated

The November meeting of the Dayton Branch was held on the 14th at the Hotel Biltmore with 35 in attendance.

The committee for the Dayton Branch 11th Annual Educational Session and Dinner Dance was announced: Chairman, **Hollie Luechauer**; Co-Chairman, **Jack Baker**; Educational, **Byron Bowman**; Hotel, **Frank Klein**; Tickets and Reservations, **Bennie Cohen**; Program and Advertising, **John Easton** and **Jack Blair**; Entertainment, **Fred Bauch**; and Favors, **Ralph Collins.**

Librarian Byron Bowman announced with this meeting the re-inauguration of the five minute talks by members of the Branch prior to the main speaker. With this, he introduced **George J. Mitchell,** head of development, Standard-Thomson Corp., Vandalia, Ohio. He gave a description and resumé of a recent development by his firm, nickel electroforming of small floats for a particular aircraft application. A picture of the plating installation as well as product samples were shown.

The main speaker for the evening was **Claude Weekly,** service and development dept., MacDermid, Inc. His topic was "Zinc Plating—Past, Present and Future." Mr. Weekly gave a historical account of zinc plating including immersion deposits, up to present-day practice. Acid bath and cyanide baths of today were discussed in detail. Mr. Weekly concluded his presentation with some predictions for the future. He expects improvements in the cyanide process whereby the high speeds now encountered with acid baths will become practical.

Refreshments after the meeting were through the courtesy of Bill Young and Co., represented by **Bill Young** and **Dick Evans.**

One of our most esteemed members, an Honorary Member of the Branch and also of the National Society recently had another honor, and one that he is very proud of, bestowed upon him. He is **Clarence "VAN" VanDerau;** his home town, Mansfield, Ohio, Chamber of Commerce gave him a life membership. In 49 years, he is only the fourth man to receive this award. Mr. VanDerau is works manager of Westinghouse Electric.

R. M. Clinchens, *Secretary*

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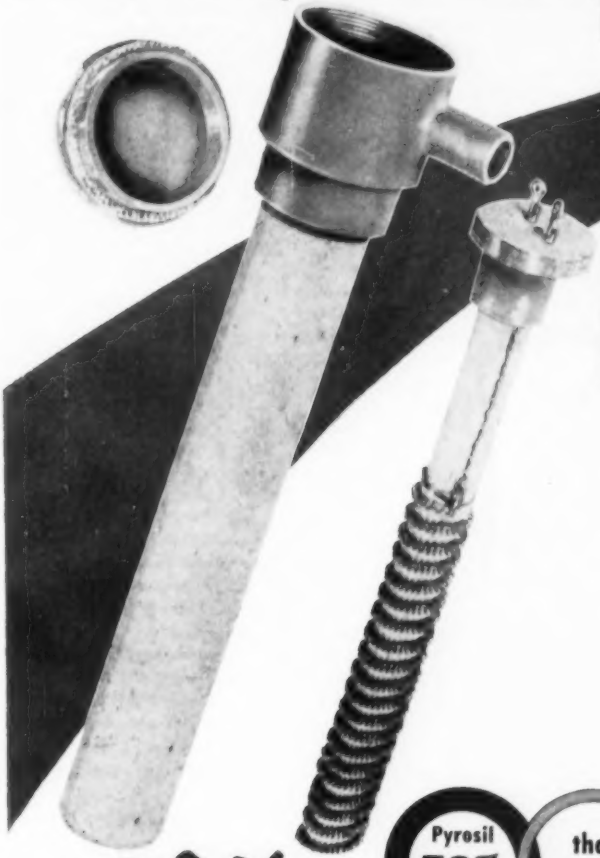

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GRAND RAPIDS

Pinner Discusses Project 15

The regularly scheduled meeting of the Grand Rapids Branch was held at Finger's Restaurant November 9, 1956.

President **John Dykstra** called the meeting to order after dinner and introduced **Herbert Head,** second vice president of the National Society. Mr. Head discussed the Interim Meeting.

Three new members.

The meeting was turned over to Librarian **Ed Krook** who introduced **W. L. Pinner** of Houdaille Industries, speaker for the evening.

Mr. Pinner is chairman of Project 15 dealing with Accelerated Corrosion Tests and he discussed this project. Both the Acetic Acid Fog test method and the Corrodkote Formula No. 59 were covered. As this is a very vital subject to everyone in this area, a lively discussion period followed the fine report by Mr. Pinner.

The usual refreshments were served.

The Grand Rapids Branch was saddened by the sudden loss of one of its most active members this month.

John J. Hanney, 57, sales engineer for Metal & Thermit Corporation, and formerly of United Chromium, Inc., died unexpectedly of a heart attack on November 24 during a hunting trip in Northern Michigan. He was born in Spring Valley, Ill. and has been a resident of Grand Rapids for the last twenty years. He is survived by his wife Gladys, a daughter and five grandchildren.

Mr. Hanney was a member of the Grand Rapids Branch for twenty years. During this time he was very active and held every office in the local branch, having served as President for the 1952–1953 term. His work on the various committees on which he served contributed very much to the success of the many plans and programs of the Grand Rapids Branch.

He was a member of the Elks, American Legion and St. Thomas Church.

P. A. Waalkes
Publicity Chairman

HARTFORD

Newell Speaks on Stress in Electrodeposition

The regular Branch meeting was held on Nov. 19, 1956 at the Bond Hotel and 99 members and guests were present. Preceding the meeting a movie entitled "Commutation of D.C. Generators" was shown.

The guest speaker for the evening was **Ike Newell** of the Henry Souther Eng. Co. whose subject was "The Role of Stress in Electrodeposition of Metals."

Mr. Newell briefly defined tensile and compressive stress and pointed out that these stresses may be present in the base metal and can be relieved by proper heat treatment.

Some baths are more prone to plate out the metal under stress as chromium plating, however, other baths will plate out under stress depending on the temperature of the bath, the impurities that are present and also the type of additives that are present. It was pointed out that stress can be responsible for peeling and blistering of plate. Various slides were shown illustrating the effect of various additives in a nickel bath on changing the plate from a compressive stress to one of tensile stress and also to plating without any stress at all.

The technical chairman for the evening was **Arthur Logozzo.**

Armand Faucher gave a brief report on new developments.

Stanley Platoz
Secretary

INDIANAPOLIS

Head a Guest; Tri-State Plans Reported

Forty members and guests attended the Indianapolis Branch November 7 meeting at Fox's Steak House. **Marshall Whitehurst** presented a past president pin to **Herb Kennedy.**

Addison Howard reporting for the committee on the branch "paper" announced the title "The Plating of High Density Tungsten Base Powdered Metal Alloys" as a work by **G. R. VanHouten** and **Dave Sivertsen.** A motion was made by **Bert Hawbee** and seconded by **Les Reynolds** and carried that the title be accepted.

Abraham Max reported the electroplating class has a wide range of fundamentals and detail problems to cover because the requirements of the students range from chemical engineers down to shop workers needing practical shop fundamentals. However, he is determined to make the course interesting and profitable.

Les Reynolds' committee gave the latest details, all pointing to a well planned meeting for the big Tri-State March 30

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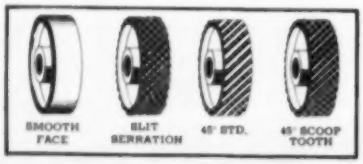

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meeting at French Lick. **Edna Rohrabaugh,** Tri-State secretary, invited the National committee to attend the meeting.

We had the honor of being host to **Herberth Head** of the National committee.

Nominations for delegates and alternates resulted in the following. **John Hood, John Holland,** and Secretary **Paul Freeman** were nominated as delegates and **Ed Bruck, Abraham Max,** and **Walter Gullison** were nominated as alternates. Since it is important to know and take part in the Interim Meeting, Les Reynolds made a motion that this branch pay the necessary expenses of one of the delegates.

A new member was accepted.

Loren Stevens introduced **Norman House** with LaSalco, as the principal speaker of the evening. Mr. House talked on the practical aspects of barrel plating. We learned the reason for anode use on one side of the tank, that 0.81 times actual amps represents more nearly the amount of plating to be found on the work, and a reasonable guide to follow when the area of the parts change. He also presented a short film to illustrate the proper load to place in a barrel and what happens when it is underloaded or overloaded with different shaped pieces.

Paul Freeman
Secretary

LANCASTER

Waste Treatment Laney's Topic

The third meeting of the current season was called to order by President **Saylor,** November 9, 1956 at the Stevens Trade School, Lancaster.

It was reported 110 members and guests were present at the October Ladies Night.

Frank Snyder of the New Haven Branch was presented as a guest.

The program consisted of an illustrated talk by **Dr. Leslie E. Laney** on "Simplified Waste Treatment for the Electroplater." His presentation emphasized the use of an integrated treatment system which indicates the use of a stagnant water rinse after each plating step that contains chemicals necessary to render harmless the toxic waste dragged in on the work rather than treat the running rinse waters. Advantages of such a system include (1) less floor space, (2) less equipment, (3) improved plated finish and (4) less quantities of chemicals used.

George S. Wells
Secretary-Treasurer

LOS ANGELES

Johnson Speaks on Ion Exchange

The November meeting was held on the 16th at Rodger Young Auditorium in Los Angeles with a total of 82 members and guests in attendance.

We were honored with two distinguished visitors: **Ezra A. Blount** of the Cincinnati Branch, and editor of *Products Finishing Magazine*, and **Jim Poulson** of the Milwaukee Branch. Mr. Blount personally invited the branch to attend the 1958 Convention in Cincinnati. **Dr. Samuel Spring,** formerly of the Philadelphia Branch, and recently in-transferred member to our branch, was formally introduced to our membership by our sergeant-at-arms, **Larry Henderson.**

Five new applicants were introduced by our membership chairman, **George Magurean,** each to be considered for initiation at the next formal meeting. Five new members were formally initiated into the branch by President **Truman Stoner.**

The co-chairman for the 1960 Los Angeles Convention, **George Hetz,** reported on the present status of the convention, stating that The Supreme Society had officially approved our 1960 Convention date—July 16 through 20. This date was selected by our chairman to allow ample time after the various nationwide school closing dates, as well as extended travel time to the far West. No committeemen have as yet been selected for the convention; however, Mr. Hetz and Mr. Stabile, chairman, will do so during the early part of 1957.

Our December meeting was designated as Ladies Night by President Stoner, and all branch members were invited to attend with their wives and/or girl friends. A fashion show was scheduled. The president also designated the January meeting as Sustaining Membership Night.

Librarian **Emmett M. Babcock** introduced the guest speaker for the evening—our own member, **Kenneth C. Johnson,** field service engineer for Industrial Filter and Pump Mfg. Co., Chicago. Mr. Johnson's talk was: "The Background and Application of Ion Exchange Systems," wherein he covered the principles of demineralization, ion exchangers and zeolite softeners, emphasizing their uses and applications especially for use in the plat-

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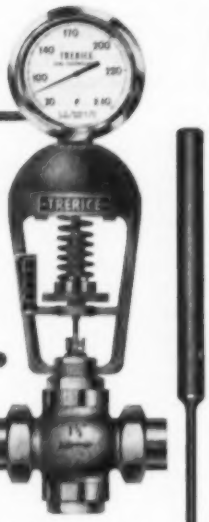

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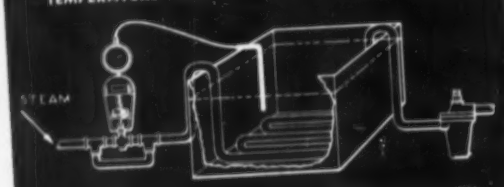

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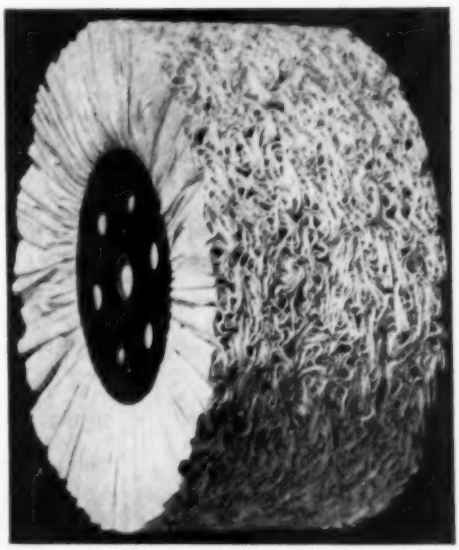

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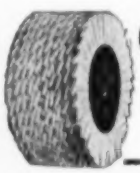

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ing room. His talk held a great deal of interest and was followed by an active question-and-answer period.

Frank Virgil
Secretary

LOUISVILLE
Ladies Night Held in October

The Louisville Branch held a Ladies Night special program meeting on Thursday, October 18, 1956 at Kapfhammers Party House, Louisville, with a dinner served at 6:30 p.m. The ladies were presented with lovely corsages. First Vice President **Stanley J. Beyer** opened the meeting at 8:00 p.m. with 33 members and guests present.

Since this meeting was especially prepared as a social with the ladies present, Mr. Beyer decided to dispense with the formalities of the business meeting. He introduced Librarian **John S. Houston,** chairman of the night's program, who introduced our speaker-guests **J. Ransdale** and **Miss Erika Schultz,** customer relations of the Reynolds Metals Co., Louisville, Ky. Pictures were shown on the Reynolds method of "do it yourself aluminum" including the use of simple tools such as scissors and pliers. Miss Schultz has demonstrated that with the use of these simple tools you can successfully make parts and shapes from the aluminum sheet into almost anything that you desire. Emphasis has been stressed especially that a lot of Christmas decorations can be made into beautiful scenery on a tree for home, office or shop, including three dimensional effects.

J. G. Sterling
Secretary-Treasurer

MILWAUKEE
Olsen and Bowerman Present Two Papers

The 473rd regularly scheduled meeting of the Milwaukee Branch was called to order by President **Herman Tessman** on November 2, 1956.

Two new members were welcomed into the Branch.

Following the Research Committee report, given by chairman **Phil Ritzenthaler,** the program chairman **Les Diveley** announced that the March 1 meeting was to be Sustaining Members Night. The National Society would be represented by **Clyde Kelly,** the District Research Supervisor. Educational program speakers would be **Dr. Leslie Holt,** from the University of Wisconsin, who will speak to the Inorganic Division and **Lloyd Gilbert** of the Rock Island Arsenal, who will speak to the Organic Division.

By far the most important business transacted by the Branch was the adoption by the membership of a change in the Bylaws which created separate divisions within the Branch for the purpose of furthering the specific interests of the members. A member may enroll in as many divisions as he chooses. Specifically this created two divisions, one devoted primarily to Inorganic Finishing and the other to Organic Finishing. The creation of these new divisions within the Branch is being observed with national interest. Mr. Diveley, sponsor of the Bylaws change, announced that the regular December 7 meeting would have the first educational program authorized by Article III, Section 8. After the combined regular business meeting the membership will have either an inorganic or organic finishing program to attend, according to their specific interests. **J. F. Day,** of the Udylite Corporation, will speak to the Inorganic Division and **Ezra Blount,** editor of *Products Finishing*, will speak to the Organic Division. There has been a tremendous interest and response to the program which it is expected will be reflected in a large attendance.

Rodney Olsen, a former president of the Milwaukee Branch and president of Shephard Plating Company, Racine, gave an interesting and practical paper on "The Problems of a Job Shop." The guest speaker for the evening was **Dr. E. R. Bowerman,** head of the Electrochemical Section of Sylvania Electric Products Company. His subject "Plating For Solderability" is a very important factor in the vast and still growing electrical and electronic industries. Dr. Bowerman discussed electroplating considerations related to soldering, how the plater can help the soldering operation by the judicious selection of deposits, how to electrodeposit solder, how to clean and prepare surfaces for soldering, and how to prepare soldered surfaces for plating. The paper was augmented with slides and a disclosure of some of the latest developments in the field.

S. R. Taterzynski
Secretary-Treasurer

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MISSISSIPPI VALLEY

Bad Weather Causes Small Attendance

The November 28, 1956 meeting of the Mississippi Valley Branch was held at the Tower in Moline, Ill. This was a business meeting and was attended by only fifteen persons, doubtlessly accountable to the extremely bad weather.

President **Lloyd O. Gilbert** opened the meeting.

John Hartman, librarian, stated that he had been approached by officers of the American Society for Metals on the proposal that we have a joint meeting whenever subjects of mutual interest are being discussed.

A discussion of increasing our membership followed, one application was presented. It was felt that much could be gained by personal calls by members on prospective members.

Stanley Baker reported that **Ed Vaughan** at St. Ambrose College has expressed a willingness to teach a course in plating if enough interest could be raised.

Paul G. Chamberlain
Secretary-Treasurer

MONTREAL

Electroplating on Aluminum Heard

The November 5, 1956 meeting at the Mount Royal Hotel was opened by President **P. M. Coady** with 35 members present.

Librarian **J. Rennie** introduced the speaker for the evening, **H. Goldman,** whose subject was "Electroplating on Aluminum."

Mr. Goldman covered his subject in great detail. After his talk he answered questions.

He was thanked on behalf of all by **J. T. Reisenburg Sr.**

Four applications for membership were received and approved.

Tribute of silence was paid to **G. Bloxall,** deceased charter member of the branch.

Report on the progress of the Dance Committee was given by **N. Cronin.**

NEW HAVEN

Papers for Plating Urged; Corrosion Film Shown

The November meeting was called to order by President **Austin Jackson.**

Ed Joreczyk reported on the progress of the Educational Committee in regards to the request for papers for PLATING. An appeal was made for articles that can be published.

Ed Busby reported on the New Haven Branch's coming Christmas party to be held at the Fireside Restaurant on December 1.

Two membership applications were read.

Austin Jackson reported on the first regional meeting held in the Statler Hotel, Hartford on October 30, 1956. This meeting set up the outline for the 18th annual N. E. regional to be held on April 27, at the Statler Hotel, Hartford. Springfield is the host branch this year. Bridgeport is handling the program, Hartford has the educational, Waterbury has the entertainment and New Haven will handle publicity.

Charles Kuster was nominated as a candidate for secretary-treasurer of the Regional Committee.

Spencer Henn of Waterbury is retiring as secretary-treasurer of the New England Regional the first of the year, after serving in this capacity for the past 17 years. Mr. Henn's services will be sorely missed and commendation for a job well done for so long a time is fitting.

New Haven Branch will not have a delegate present at the Interim Meeting.

Ed J. Foley Jr. of Enthone Inc., technical chairman for the evening, gave a short talk on the movie that was to be presented, summing-up the highlights and interesting points.

The one hour movie "Corrosion in Action" by the International Nickel Co.

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Inc., proved very educational and was enjoyed by all present.

The door prize was donated by **Jack Barry,** F. B. Gumm Chemical Co.

B. J. Gaffney
Secretary-Treasurer

NEW YORK
Dr. Lowenheim Speaks on Alloy Plating

The October 26, 1956 meeting at the Hotel Statler was called to order by President **D. Hartshorn Jr.**

One new application for membership was received and approved. A new member was accepted.

Librarian **Joe Rembecki** introduced the speaker of the night, **Dr. Frederick Lowenheim** of the Metal & Thermit Co., "Recent Developments in Alloy Plating" was Dr. Lowenheim's topic, and with the aid of slides, he presented a very instructive lecture to one of the largest gatherings of the season.

Anthony P. Briganti
Recording Secretary

NEWARK
Delegates Elected; Two Speakers

The November meeting of the Newark Branch was held on the 16th with President **Struyk** presiding.

Following the presentation of the movie "Bright Steel" by **Howard Cobb** a business meeting was held at which time eight new members were elected. The nominating committee, **Eugene Wagner,** chairman, **Frank England** and **Thomas Austin** placed the following in nomination for delegates to the Interim and Montreal meetings: Delegates, Howard Cobb, Donald Foulke, and George Wagner; Alternates, Dodd Carr, Robert Horrocks, and Gerald Lux. All were duly elected.

William Grigat reported on the Christmas Party to be held on December 15, urging all to attend the social function, also the educational session on December 14.

Dr. Dodd Carr introduced **Kenneth Irgens** of Hanson-Van Winkle-Munning Company who chose as his topic "Cleaning and Etching of Aluminum," reviewing the various methods for treating aluminum, emphasizing alkaline etching and the methods for preventing scale formation. The chief speaker of the evening was **N. L. Miller** of Turco Products, Inc., who discussed the Chem Mill process in some detail after showing a movie of the process in action. The extreme interest in the process by the 75 in attendance was shown by numerous questions.

D. Gardner Foulke
Secretary

PHILADELPHIA
Graham and Fulforth Made Honorary Members

The regular meeting was held on November 26 at the Engineers' Club. Dinner was served to about 25 in the main dining room; about 35 were present when Branch President **Trusdell** called the meeting to order, although late-comers and **Dr. Heiman's** plating class brought later attendance to 60. Mr. Trusdell discharged the 1956 Banquet Committee with thanks. Five new active members were admitted and one application was received.

Mr. Trusdell, citing the poor attendance at the last educational session, spoke of separating the educational session from the banquet as a means of improving attendance. The secretary spoke along the same lines, followed by debate from the floor. The subject was laid over to a future meeting for settlement. Mr. Trusdell announced that the Branch delegates intended to attend the forthcoming Interim Meeting in Pittsburgh.

A petition by **George Long** to make **Dr. A. Kenneth Graham** an Honorary Member was adopted, as was a petition by **Edward Hoffman** to make **Frederick Fulforth** an Honorary Member of the Philadelphia Branch.

Librarian **C. Brooks Ricca** introduced **Henry Strow,** True Brite Chemical Products Co., who spoke on "Bright Brass Plating." He gave the historical background of brass plating, the composition and operating conditions of traditional baths and the details regarding modern brass plating bath compositions, including control.

I. Wm. Marcovitch
Secretary

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PITTSBURGH

Plan Organization of Ladies Auxiliary

The November meeting of the Pittsburgh Branch was held November 7 at the Gateway Plaza in Pittsburgh's Golden Triangle. Dinner was attended by thirty members and guests.

The business meeting was opened by **Herb Schram,** first vice president, in the absence of President **Myron Ceresa,** who is recuperating from a recent operation.

Two applications for membership were presented to the Branch.

A rising vote of congratulations was given **Frank Keller** who was elected to Honorary Membership in the Branch last month.

Chairman of the forthcoming Interim Meeting being held in January, **Jack Coros,** presented a report on the progress of his committee. The Penn-Sheraton Hotel has been selected as headquarters for the meeting and Chairman of Housing **Rex Goldbach** has arranged for rooms at the Pittsburgher and Roosevelt Hotels for the delegates attending. Due to a glass convention in Pittsburgh at that time, it was not possible to obtain housing in one hotel.

Other committee chairmen were announced by Mr. Coros. They are: Equipment and Notices—**J. R. Crain;** Registration of Delegates—**E. J. Smith;** Luncheon—**R. A. Woofter;** and Cocktail Party—**R. M. Burford.**

A report on the proposed Ladies Auxiliary was presented by **Scott McCormick** in the absence of Chairman Bob Burford. The February meeting is the probable night which the Branch members will be asked to bring their wives or girl friends to dinner. Entertainment will be furnished while the business meeting is being held. It is hoped that the women will be able to get better acquainted and possibly organize themselves for future meetings.

The guest speaker of the evening was then introduced by Librarian **Dick Woehrle. Dr. G. A. Lux** of Oakite Products was the speaker and the subject of his extremely interesting paper was "Some Fundamentals of Electrocleaning." Dr. Lux listed the requirements essential for a good electrocleaner and explained each in detail with demonstrations.

Drawing for the door prize was held and **Dave Porter** was the winner of an electric fry pan. The prize was donated by **Bill Pizoli** of Oakite.

Fred Stevens
Secretary

PROVIDENCE-ATTLEBORO

Strow Talks on Brass Plating

The Providence-Attleboro Branch held its regular monthly meeting Monday, November 19, 1956 at the Providence Engineering Society Building.

The meeting was called to order by President **Kershaw.** Approximately forty members and guests were present.

Mr. Kershaw announced the Interim Meeting of the Supreme Society to be held in Pittsburgh, January 12, 1957. He asked Delegates and Alternates to contact him in regard to representing the Local Branch.

Two new members were presented.

Mr. Kershaw announced that the Annual Christmas Party will be held Monday, December 10 at the Wayland Manor.

John Cahill, librarian, introduced **Dr. Henry Strow** of the Tru-Brite Chemical Products Co. who gave an extremely interesting talk on "Controlled Brass Plating." One of the outstanding points Dr. Strow discussed was that a brass plating solution would operate correctly over a wide range of conditions if the various constituents were at the correct ratios.

F. L. Sherman
Secretary

ROCHESTER

Tin and Tin Alloy Plating Covered by Speaker

The November meeting was held at the 40/8 American Legion Club and was called to order by President **Fred Thiem.**

Business matters discussed included: the election of a new member; the upcoming National meeting of delegates in Pitts-

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burgh with the possibility of Rochester being represented; the Christmas party to be held on December 8; and suggestions from the floor as to how to bring out more members to the monthly meetings.

The librarian, **Lorin Correll** introduced the speaker of the evening, **Robert Gore,** market development engineer of Metal & Thermit Corp. Mr. Gore presented the Practical Aspects of Tin and Tin Alloy Plating covering the whole alloy field of tin including: tin-nickel, tin-zinc, tin-cadmium, tin-lead and tin-copper. Slides were shown to better enhance the very interesting talk given by Mr. Gore.

Linwood P. Morrison
Secretary-Treasurer

ROCKFORD
Speaker on Germanium Rectifiers

The regular monthly meeting was held Monday, November 12, at the Faust hotel with 40 members and guests present for dinner. Fifty-one were in attendance for the business meeting which followed.

President **Bill Geissman** opened the meeting. Announcement of the Interim Meeting to be held in Pittsburgh, January 12, was made. Bill Geissman and **Leonard Weeg** will attend.

A motion was made by Mr. Geissman and seconded by **Walt Fox** to place the name of **Lloyd Gilbert** as candidate for 3rd vice president of the National Society.

Three new members were elected.

Librarian **Bob Twying** showed two very interesting films on electronics received from the Minneapolis-Honeywell Company.

John Mungenast was guest speaker, his topic being, "Germanium Plating Rectifiers." Mr. Mungenast who is chief sales engineer for General Electric Co. proved to be an outstanding speaker. Much credit goes to his company for allowing him to travel such a great distance to be with us.

Ellsworth Candee will be the speaker for the December meeting and **Gerry Tux** for January, which will be ladies night.

Meeting adjourned 10:10 p.m.

E. J. Budden
Secretary-Treasurer

SAGINAW VALLEY
Aluminum Alloy Anodic Treatment Discussed by Vanden Berg

The October 10, 1956 meeting of the Saginaw Valley Branch was held in the Colonial Room at Zehnder's Hotel in Frankenmuth, Michigan.

A roast beef dinner was welcomed and enjoyed by 76 electroplaters.

After a brief business meeting the principal speaker of the night, **R. V. Vanden Berg** of Aluminum Company of America, discussed "Commercial Anodic Treatment of Aluminum Alloys." The talk was very informative and interesting especially the chemistry of the anodic films.

A question and answer period followed, during which members presented both specific and general questions about working with aluminum.

Charles Melekian
Recording Secretary

ST. JOSEPH VALLEY
Report Heard on AES Project 15

Forty-eight members and guests of the St. Joseph Valley Branch of the AES met October 3, 1956, at the L. H. Inn. **A. G. Wiegand,** 1st vice president, presided in the absence of President **Gene Roth.**

Dr. H. J. Wiesner, member of the Editorial Board of PLATING, spoke of the shortage of technical papers and urged members to take action in remedying this situation. Dr. Wiegand asked the members to properly fill in and return audit cards sent by PLATING magazine.

Roman Bender of the Indianapolis Branch extended a cordial invitation to attend the Tri-State meeting at French Lick, Indiana.

Six new members were elected. Two applications for membership were read and approved.

Ralph "Duke" Wysong, newly elected national 3rd vice president, reported on the convention and then introduced the speaker, **Walter Pinner,** manager, Process and Devp. Section of Houdaille Industries, Inc. Pinner spoke on AES Project 15, Accelerated Corrosion Tests.

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now accepted salt spray corrosion test. Pinner pointed out the many shortcomings of the latter as being: not reproducible as adjudged by four laboratories, does not duplicate service conditions and no differentiation between Zn and Cd, and no differentiation between thick Cu under thin Ni as opposed to all Ni.

Detroit was chosen as a typically bad area and license plate size test panels were used. The panels of steel and diecast were Cu, Ni, Cr taper-plated with the thickness of 0.0003 to 0.003 from one end to the other. These panels were then placed on taxies and private cars and exposed during the winter months. Pinner pointed out that a real cost of approximately $200,000 has been assumed by private industry. The cost to the AES has been approximately $400 to date.

Of about 20 original concepts, all but two have either been discontinued or deferred. The acetic acid modification of present salt spray and the Corrodkote test are presently being evaluated. At present, both show certain desirable qualities.

Results from the acetic acid test have so far shown reproducibility. In the Corrodkote test, corrosion is a controlled mechanism dependent on the fact that a part made wettable by abrasives will corrode when exposed to a high humidity. The corroding medium was formulated after extensive analysis of slush and rain from the Detroit area. The formulation exactly duplicates the type and degree of natural corrosion and is reproducible. Factors as the per cent of humidity, time of exposure, and the thickness of rubbed-on coating are still unknowns, but are presently being evaluated. Slides were shown that helped clarify the excellent report.

Henry A. Meers
Secretary

Printed Circuits Talk by Modjeska

The November 7, 1956 meeting was held at the L. H. Inn in Mishawaka, Ind. Fifty-two members and guests attended the dinner and technical session. President **Roth** asked **Mr. Anderson** of the Indianapolis Branch to explain the function of the Tri-State Regional Group. **Ralph Brower** moved that the executive committee investigate and act on the possibility of the Branch joining the organization.

One transferred member was received, two new members elected, and three applications were received.

Dr. H. J. Wiesner introduced **R. Scott Modjeska** of Scientific Control Laboratories. Mr. Modjeska's work in filtration and cyanide removal is well known.

His subject of printed circuitry involves the coordination of electronics and plating on non-conductors with an unusual amount of the graphic arts. He said methods of obtaining a printed circuit may be divided into three types:

(1) Plated Circuits: involve the application of a conductive film to a non-conducting surface. Phenolic impregnated paper is the usual dielectric base. Silver is applied by sensitizing the surface and subsequent reduction of ammoniacal silver nitrate with hydrazine hydrate. A resist is applied by drawing and photographic technique, leaving exposed only the desired circuit which is then acid copper plated. The extremely thin film of silver cuts the conductivity to about 65 and therefore reduces the maximum current density. Work is cathodic on immersion to prevent lifting of the silver film. After plating, the resist must be removed in a way to prevent redeposition of silver on the freshly plated copper. The conductivity of the plated copper is not as high as rolled copper. The adhesion is not perfect in any circumstance.

(2) Etching Technique: The greatest number of finished printed circuits are produced by this method. In this process copper laminates are screened in reverse and the copper not in the final circuit is etched away by ferric chloride. Objections to the process include the initial expense of the laminate and the fact that purchased copper is an eventual waste product.

Assembling of electronic equipment is the largest single cause for rejects. To avoid this, platers are often requested to electro-solder together printed circuits.

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Mr. Modjeska showed excellent examples of printed circuits and answered numerous questions concerning the process.

Henry A. Meers
Secretary-Treasurer

ST. LOUIS
Illustrated Talk on Barrel Finishing

The first fall meeting of the St. Louis branch was held October 10 at the York Hotel. Twenty-two members were present for dinner. President **Coulson** called the meeting to order by having the 31 members and guests stand and introduce themselves. Eight new members were accepted.

Andy Julius and **Craig McAlister,** delegates to the national convention, gave their reports. **Lou Berra** reported for the entertainment committee. **Ed Sertl** reported the starting of the plating school at the O'Fallon Technical School. **Otto Kline** of The American Zinc Co. is the instructor.

New committee appointments were made by President Coulson: **Gene Conroy,** entertainment; **Craig McAlister,** membership, who selected **Robert DeGuire** and **Ruel Shumway** to work with him on this committee; **Ed Sertl,** educational; **William George,** sustaining membership committee—**Arthur Wrisberg** to work with him.

At this point the meeting was turned over to Librarian Ed Sertl who outlined his plan for speakers for the year. He introduced **Don Duffney** of Roto Finish Company who showed slides of new equipment and processes for barrel finishing.

Ward W. Kelly
Secretary-Treasurer

ST. LOUIS
Report on Plating School

The regular monthly meeting of the St. Louis Branch was held at the York Hotel, Wednesday, November 14. There were 25 persons for dinner.

After dinner the meeting was called to order by President **Coulson** with 31 members and guests present.

One new member was approved.

Lou Berra was called upon to report on the progress of the plating school. **Ed Sertl,** chairman of the school committee, thought since Lou is a member of the school he could best report to the members how the school was progressing. He reported great interest in the school. The attendance is good and atomic structure is being taught.

In the absence of the banquet committee chairman, Lou Berra again reported. The committee is working on lining up advertisers for the program.

Craig McAlister reported he plans to use the form submitted by Mr. Head and mail letters to St. Louis University and Washington University.

A discussion was held relative to the Interim Meeting of delegates to be held in Pittsburgh. It was decided to take up this matter further at our next meeting. At this point the meeting was turned over to Librarian **Ed Sertl** who introduced **Don Morris,** senior field electrochemist, for Hanson-Van Winkle-Munning Company's Chicago District Office. His talk entitled "Current Nickel Plating Practices" covered three primary aspects in nickel plating:

1. Increased plating speeds
2. Leveling
3. Increased corrosion protection

Of great interest to the group was the work being done on duplex coatings. Slides were used to illustrate the talk.

Ward W. Kelly
Secretary-Treasurer

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SEATTLE-PUGET SOUND
Standards for Waste Control Discussed

Thirty-two members were present at the first meeting of the Fall season, which was held on Wednesday, September 26.

The initial business of the evening was a discussion of suitable action to be taken in working with the Washington State Pollution Control Commission to set up standards for waste control in the metal finishing industry.

A short summary of activities at the June convention was then presented by delegates **Roy Smith** and **Forester Bradford.**

The educational portion of the evening began with the introduction of the speaker, **Dr. Richard Saltonstall** of the Udylite Corporation. Dr. Saltonstall held the attention of our group with a comprehensive outline of the history, development, and latest recommended practices in bright nickel plating.

The meeting concluded with an informal discussion of recent findings in regard to the problem of eliminating hydrogen embrittlement.

William P. Foley
Secretary

Waste Control Standards Heard

The second fall meeting of the Seattle-Puget Sound Branch was held on Tuesday, October 30, at Andy's Diner.

The president read a letter from the National Headquarters urging our cooperation in contributing articles and papers for the Society's publication, PLATING. It was voted that we should set up a local award system to increase incentive in this field, and **George Millard** was appointed chairman of a committee to activate the program. The chairman went to work immediately; and we were able to secure promises of serious work from several of the members present.

The Program Committee decided to investigate the possibility of holding our next meeting at the College Club.

Lyle Neilsen of the State Pollution Control Commission was present as a guest and brought us up to date on the progress of the Commission in the work of setting up standards and limitations for waste control in our industry.

Two membership applications were considered and approved.

The speaker of the evening, **Kenneth W. Smith** of Washington Steel Products, was introduced by the president. Mr. Smith discussed human relations in the job shop and reviewed, both from theory and personal experience, the too-often overlooked rules involved in most efficiently and tactfully dealing with people.

William P. Foley
Secretary

SOUTHEASTERN
Films and Talk on Silver

The Southeastern Branch held its regu-

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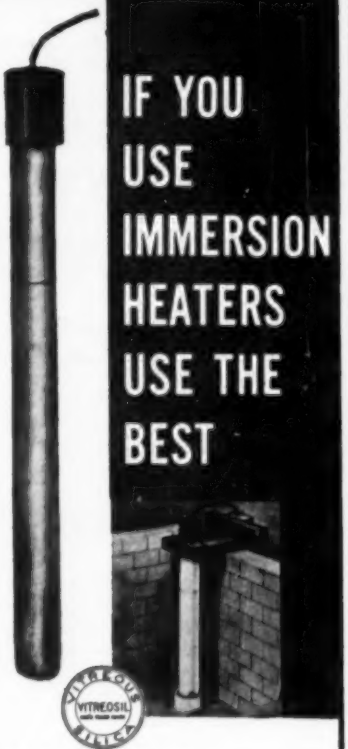

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lar meeting on October 12, at the Belmont Steak House, in Atlanta, Georgia.

Further plans were processed for the 2nd Annual Technical Session to be held next February 1957. **Claude J. Nalley,** 2nd vice president, presided with 18 members and guest present. **H. R. Stogner Sr.** introduced **M. C. Robbins,** Southern District manager of Handy & Harmon, and a member of the Branch, who presented a delightful talk on "Silver Down Through the Ages." Mr. Robbins told of the history of silver, thoroughly and authoritatively covering every aspect from the processes and money value of the early developments up to the modern day. Two color movie films were shown; one showing skilled silver craftsman and his handiwork in the making, and the other showing the refining of scrap and mud to recover the precious metals.

Robert H. Probert
Secretary & Treasurer

Dysart on Temperature Control

We met at the Belmont Steak House, Atlanta, Ga., November 9, 1956, with 21 members and guest present, and **George Taylor** presiding. One application for membership was announced. **Ed Logan** moved that our branch furnish Georgia Tech with a one-year subscription to PLATING magazine, subject to Georgia Tech's approval. The motion was passed. Mr. Logan reported on the progress thus far made on his high school educational program.

He also reported the progress to date towards the 2nd Annual Technical Session scheduled for next February 8 and 9, 1957. **H. R. Stogner Sr.** announced that six well-known and authoritative speakers had been confirmed for the Technical Session. **Fred Fulforth,** distinguished guest and past president of AES, appealed to our branch membership for Technical Papers for PLATING magazine from the Southeastern Branch. **Dave Griffin** moved that **Pete Kovatis,** member of AES and executive secretary of the NAMF be granted a few minutes on the program at our Technical Session for the purpose of familiarizing our membership with the cause of the NAMF and acquainting them with the advantages of NAMF membership. It was announced that **John P. Nichols,** executive secretary of the AES, would attend our Technical Session next February. Mr. Stogner introduced our speaker, **L. S. Dysart,** sales manager, Fulton Sylphon Division, who presented an interesting lecture on self-actuated temperature regulators on plating and other metal finishing jobs. **Jean Giesler,** member of our branch and an engineer at Fulton Sylphon, participated in our usual question and answer session.

Robert H. Probert
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SPRINGFIELD

Kosmos Speaks on Cadmium and Zinc Plating

The Springfield Branch met at Blake's Restaurant on October 22. There were over 30 members and guests present. Two new members were welcomed. There was a short discussion on the coming fundamentals of the electroplating course which the Springfield Branch is sponsoring. **Robert Girard** is chairman of the course committee. The course will run for eight Tuesdays, with a break for the holiday season. The subjects and speakers are as follows: Introduction to Electroplating by **Louis V. Gagnon** of Frederick B. Stevens Co.; Preparation for Electroplating (Degreasing, Electrocleaning and Pickling) by **Harry Sanders** of Enthone, Inc.; Electric Power for Plating by **Dr. Harry Walker** of Walker Division, Norma Hoffman Bearing Corp.; Polishing and Buffing by **Wayne Sanders** of The Mosher Co.; Racking of Plating Work by **Raymond Mitchell** of Mitchell-Bate Co.; Copper & White Nickel Plating by **Joseph Haas** of Underwood Corp.; Bright Nickel and Chromium Plating by **Arthur Logozzo** of Nutmeg Chrome Corp.; Cadmium and Zinc Plating by **Ralph C. McCahan** of Dupont, Inc. Serving on the committee are **William Grover, Edward F. Koetsch, Ralph Mongeau** and **Charles F. Griffin.**

The guest speaker for the technical session was **"Old John" Kosmos** of the Newark Branch and of Kosmos Electro-Finishing Research, Inc., Hackensack, N. J., formerly a member of the Springfield Branch. His subject was "Practical Aspects of Cadmium and Zinc Plating—Their Protective and Decorative Coatings." It was a very enlightening and entertaining evening, with the colored explanatory slides.

Henry L. Heissfeld
Secretary

Dr. Narcus on Metallizing Nonconductors

The Springfield Branch met at Blake's Restaurant for the November meeting, on Monday the 26th. The speaker for the evening was **Dr. Harold Narcus** of Electrochemical Industries, Inc. of Worcester, Mass. He spoke on Metallizing of Nonconductors. The poor attendance was more than made up for by a continual flow of questions and discussions that followed, and it was generally felt that the members who missed this meeting lost out on a most intriguing subject.

The course on Fundamentals of Electroplating which is being sponsored by the Springfield Branch will swing into its fourth week with next Tuesday night's session on Racking of Plating Work by **Raymond Mitchel** of Mitchel-Bate Co., and Polishing and Buffing by **Wayne Sanders** of Mosher Company. Over 90 men and women have registered.

Henry L. Heissfeld
Secretary

SYRACUSE

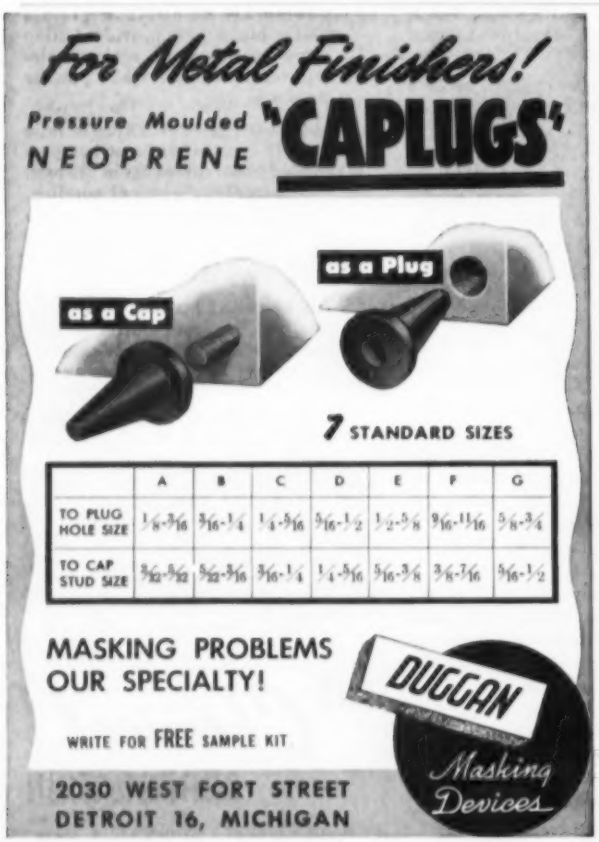
Titanium Subject at Opening Meeting

On September 17, 1956 the Syracuse Branch held its opening meeting for the fall season at the Liederkranz. Appetites were silenced with excellent beef. **Douglas H. Wilson,** supervisor of titanium production for Rem-Cru Titanium, Inc., gave an informative talk entitled "The Titanium Industry."

Details of the Kroll method of titanium sponge production were given, followed by the production details in melting sponge to ingot. The best way to show the growth of this relatively new industry is to state the production figures for wrought products. The output in 1954 was 2,500 tons, 1956 estimated at 6,000 tons and the projected figure for 1960 is 50,000 tons which at the present market price amounts to 3–400 million dollars.

The many uses of titanium and its alloys were mentioned with particular attention paid to those in the chemical industry such as corrosion resistant filter parts, valves, condensers and anodizing racks. Following the talk Wilson answered many questions.

Members from outlying areas such as Utica and Oneida were in attendance with **John Bunsie,** Southern Tier Branch



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The November meeting will be held at Turners' Hall, 619 North Salina Street, Syracuse.

Milton F. Stevenson
Secretary

Uses of Stainless Steel Heard

On October 15, 1956 the Syracuse Branch held its monthly meeting at Turners' Hall, 619 North Salina Street, Syracuse. After dinner, **Grant Snair,** a chemical engineer in the Application and Development Department of Allegheny Ludlum Steel Corporation, gave a talk on "Surface Characteristics of the Stainless Steels."

The many uses of stainless steel in the automotive industry were discussed. It was interesting to note that stainless trim is chrome plated so that it will match the other plated trim.

Stainless steel rollers and molds are chrome plated in any application where heat is applied in excess of 400° F and the resulting heat tint might stain the product.

The new "200 series" of stainless steels was discussed. As a result of the constantly increasing use of nickel in stainless steels and the repeated restrictions in the use of nickel and nickel alloys, the chromium-nickel-manganese austenitic stainless steels have been developed. The compositions now being produced, Types 201 and 202 for example, have properties which make them equivalent to Types 301 and 302 in many applications where these chromium-nickel stainless steels formerly have been virtually irreplaceable. In certain respects the new low nickel-high manganese steels have properties that are better than the older materials.

Following the technical session refreshments were provided by Allegheny Ludlum Steel Corporation. This was through the courtesy of **Stan Goodman,** district manager, and **Lang Wagoner,** both from the Syracuse Office.

During the business meeting the Syracuse Branch unanimously approved a resolution giving its full support behind **George Cavanaugh** who is running for third vice president of the society.

Preparations for the Syracuse Branch Christmas Party are well under way with **Ken Parnell** taking charge this year.

There are two new members of the Syracuse Branch.

Milton F. Stevenson
Secretary

TORONTO
Weekly Discusses Bright Copper Plating

The October meeting of the Toronto Branch was held in the Royal York Hotel. Forty-six sat down to dinner and 58 attended the meeting. **John Smith** presided. The talk, "Bright Copper Plating," given by **Claude Weekly** of MacDermid Incorporated was quite interesting to everyone.

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Ray Day, second vice president and chairman of entertainment, has the Annual Dance well organized.

Ben Cameron, official delegate to the Washington Convention, gave his report, short, but to the point.

The speaker was introduced by **Doug Hanna** and a hearty vote of thanks extended by the venerable gentleman—**Jim Guffy.**

A. W. Wilson
Librarian

WATERBURY

Eddy Speaks on AES Headquarters

Waterbury Branch held its monthly meeting at the Colonial Room, Roger Smith Elton Hotel Thursday, October 11, **Theodore Voyda** presided. Speaker was **Isidore Cross,** secretary-treasurer of Harper Leader Inc., Waterbury. The subject of Cross' talk was "Vacuum Metallizing."

Ed Garland reported on his ideas for an exhibit for the National Convention to be held in June 1957. A committee has been chosen to make plans for our Christmas Party: **H. Moran, Ed Washburn** and **F. Bergen.**

Spencer Henn reported on the progress of his membership committee; and it seems that if his ideas work, we should increase our membership considerably.

A suggestion was made to change our business meeting, which is now scheduled at 7:00 p.m. between our dinner meeting and our technical meeting, to be held on a separate night. A vote was taken and the majority favored the separate night arrangement, which will be held at a member's home.

Frank Eddy, 1st vice president of our National Society, spoke on the changes made in our National Office.

Sustaining Members Night Planned

The November meeting was held in the Colonial Room of the Roger Smith Elton Hotel. The meeting was opened by President **T. Voyda** who immediately turned it over to Secretary-Treasurer **Al Griffith.**

Plans for a Branch Sustaining Members Night were reported and the part that the Waterbury Branch will play in the New England Regional Meeting to be held in April 1957.

Mr. Griffith then turned over the meeting to **Al Knotowicz,** technical chairman of the evening who, after the movie "Glass Center of Corning," introduced **Barnet Ostrow,** general manager of Lea Ronal, Long Island City, N. Y.

After an excellent discourse on mechanism of a brass plating bath and conventional versus newly developed baths, the meeting was opened for discussion.

Nicholas Topazio
Publicity Director

WESTERN ONTARIO

River Pollution Problem

Western Ontario Branch held its October meeting at the William Pitt Hotel in Chatham, Ont.

At this meeting the speaker was **Herbert Geduld,** with the R. O. Hull & Co. Inc. His subject was "Practical Problems in Bright Zinc" and "The Hull Cell."

All members agreed that this was the type of speaker they would like to have on all other phases of the problems of the industry, because the speaker could recommend solutions to their problems from the practical point of view.

It was also decided that it might be well for the plating industry in this area to look into the problem of water pollution to the rivers, as it applies to the industry. We would appreciate hearing what other branches have done or are doing about this problem.

Earl Patterson
Vice President

Organic Coatings Subject of Speaker

The regular meeting was held at the William Pitt Hotel in Chatham, Ontario on November 16, 1956.

The speaker was **Don Meserve,** product manager for organic coatings of the Metal & Thermit Corp., who gave a very interesting talk on the subject of "Coatings."

At this same meeting two new members were added to our group and final plans

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were made for the Ladies Night Dance to be held on January 18, 1957 at the William Pitt Hotel in Chatham.

Earl Patterson
Vice President

WICHITA

Crystal Formation Presented; Waste Disposal Controlled

The first meeting of the fall season was held at Jerry's Serva-Teria on September 26, and featured a smorgasbord dinner. Twenty-one members were in attendance. Professor **Kenneth Rose** was guest speaker for the evening. Professor Rose presented a program entitled "Crystal Gazing" which, with the aid of a micro-projector, held his audience spellbound as they viewed the actual growth of crystals formed during solidification of Thymol, O-Nitro Phenol, Galena and other chemical substances.

Rose, presently Professor of Metallurgy and Mining at the University of Kansas, is a graduate of the Colorado School of Mines and received his Master's Degree in Metallurgy from Cornell University. He is well known for his work in educational programs for various technical societies and in 1955 won the National American Society of Metals, Metallurgical Teaching Award.

Other highlights of the meeting included an announcement by the Waste Disposal Committee Chairman that the City of Wichita has been awarded a fund to establish a centralized chromic acid disposal plant. It is anticipated that a tank truck, included in the award, will be able to service all of the plating shops in the Wichita area. The Wichita Branch takes pride in having been active in the achievement of low cost waste treatment for small shop owners and in assisting the city in their fight against stream pollution. Our hats are off to **Glen Summers** and **Harley Babst** for their fine work on this project.

One new member, **James Pake** of the Boeing Airplane Company, was voted into the Society at this meeting. **Earl Spangler,** treasurer, gave a Financial Report and a Report of Membership. Librarian **E. Van Meter** announced the future meeting schedule which includes a talk by **Turk Heumann** of the O. A. Sutton Company on Painting Practices, November 28, and a tour of the Beech Aircraft Company on October 24. Van Meter advised all to make early plans to attend the Annual Christmas Party which will be held on December 7, promising that this year's party would be bigger and better than ever.

Richard A. Balbierz
Publicity Chairman

INTERIM MEETING

Penn-Sheraton, Pittsburgh, Pa.

FRIDAY, JANUARY 11:

10 A.M.—Executive Board Meeting, Parkview Room.

6:30 P.M.—Pittsburgh Branch Dinner, Gateway Plaza.

8 P.M.—Pittsburgh Branch Meeting, Gateway Plaza.

SATURDAY, JANUARY 12:

10 A.M.—Interim Meeting, Pittsburgh Room.

12:30 P.M.—Interim Meeting Luncheon.

1:30 P.M.—Interim Meeting.

5 P.M.—Cocktail Party, Pittsburgh Room.

SUNDAY, JANUARY 13:

10 A.M.—Executive Board Meeting, Grant Room.

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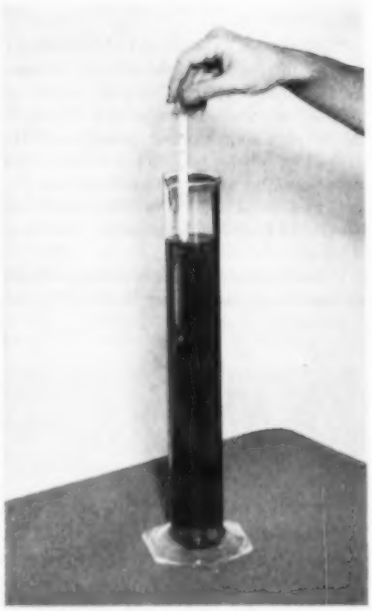

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FUTURE MEETINGS

AES

January	11	**Special Interim Meeting-Pittsburgh Branch Dinner,** Gateway Plaza, Pittsburgh, Pa.
January	11-13	**Executive Board Meeting,** Penn-Sheraton Hotel, Pittsburgh, Pa.
January	12	**Interim Meeting,** AES Supreme Society, Penn-Sheraton Hotel, Pittsburgh, Pa.
January	12	**Educational Session and Dinner Dance,** Cleveland Branch, Hotel Carter, Cleveland, Ohio
January	18	**Editorial Board Meeting,** Sheraton-Mount Royal Hotel, Montreal, Canada
January	25	**Research Committee Meeting,** Conrad Hilton Hotel, Chicago, Ill.
January	26	**Annual Meeting,** Chicago Branch, Conrad Hilton Hotel, Chicago, Ill.
February	8-9	**2nd Annual Technical Session,** Southeastern Branch, Biltmore Hotel, Atlanta, Ga.
February	16	**Annual Educational Session and Dinner Dance,** Grand Rapids Branch, Pantlind Hotel, Grand Rapids, Mich.
March	2	**Annual Technical Session and Banquet,** New York Branch, Hotel Statler, New York City
March	9	**Annual Educational Session and Dinner Dance,** Dayton Branch, Dayton, Ohio.
March	30	**Third Annual Tri-State Regional Meeting,** French Lick Sheraton Hotel, French Lick, Ind.
March	30	**Annual Educational Session and Banquet,** Rockford Branch, Faust Hotel, Rockford, Ill.
April	27	**18th Annual New England Regional Meeting,** Statler Hotel, Hartford, Conn.
April	27	**3rd Empire State Regional Meeting,** Grand Ballroom, Onondaga Hotel, Syracuse, New York
April	27	**Symposium,** IMPORTANT ENGINEERING CONSIDERATION IN THE PLATING ROOM, Milwaukee Branch, Hotel Schroeder, Milwaukee, Wis.
June	16-20	**44th AES Annual Convention,** Sheraton-Mount Royal Hotel, Montreal, Canada
May	19-22, 1958	**45th AES Annual Convention,** Sheraton-Gibson Hotel, Cincinnati, Ohio
June	14-18, 1959	**46th AES Annual Convention,** Detroit, Mich.

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INTERSOCIETY

January	28-31	**Plant Maintenance and Engineering Conference and Show,** Public Auditorium, Cleveland, Ohio
February	5-7	**12th Annual Technical and Management Conference,** Reinforced Plastics Division, The Society of the Plastics Industry, Edgewater Beach Hotel, Chicago, Ill.
March	25-29	**10th Western Metal Exposition and Congress,** American Society for Metals, Pan-Pacific Auditorium and Ambassador Hotel, Los Angeles.
May	12-16	**Electrochemical Society,** Statler Hotel, Washington, D. C.
November	4-8	**39th National Metal Exposition and Congress,** International Amphitheatre, Chicago, Ill.

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INDEX TO ADVERTISERS

This index is published as a service to our readers. We regret we cannot assure avoidance of inadvertent errors and omissions despite the many precautions exercised.

Acme Mfg. Co. 27
Allied Industries Co. 101
Allied Research Products 32D Flap
Almco Div., Queen Stove 77
American Buff Co. 71
American Metals Co. 89
Automatic Rubber Co. 81

M. E. Baker Co. 76
Baker-Adamson Div. 9
Beam-Knodel Co. 102
Belke Mfg. Co. 35
Better Finishes & Coatings, Inc. 58
Booton Radio Corp. 8

Chemical Corp. 105
Chicago Rubber Co., Inc. 92
George R. Churchill Co., Inc. 94
Sigmund Cohn Mfg. Co. 97
Commercial Filters Corp. 107
Conversion Chemical Corp. 76

Davies Supply & Mfg. Co. 82
Diamond Alkali Co. 85
Diesel Chemical Co. 82
Du-Lite Chem. Corp. 104
Duggan Masking Devices 106
E. I. DuPont de Nemours & Co. 18

Electrical Materials Co. 92
Elkhart Controls Co. 26
Enthone Inc. 3

Paul Frank 96
Federated Metals Div., American Smelting & Refining Co. 62

General Electric 10, 11
Grav-I-Flo Corp. 63
Great Lakes Nickel Co., Inc. 103
G. S. Equipment Co. 75
Guaranteed Buff Co., Inc. 100
Frederick Gumm Chemical Co. Inc. 2nd Cover

Hanson-Van Winkle-Munning Co. 21, Back Cover
Harrison and Co. 108
Harshaw Chemical Co. 6
Haveg Industries Inc. 73
Hergenrather Associates 111
R. O. Hull & Co. 16

Illinois Water Treatment Co. 19

Jefferson Metals Co. 107
Joe-D Buff Co. 19

Kocour Co. 94
Joseph B. Kushner 101

Lasalco, Inc. 17
Lavin, R. & Sons, Inc. 67
Charles F. L'Hommedieu & Sons 29
Lea Mfg. Co. 34A
Lea Mfg. Co. of Michigan 109
Lea-Ronal Inc. 34B
MacDermid, Inc. 3rd Cover
McAleer Mfg. Co. 96
Magic Chef Inc. 102
Meaker Co. 84
Merchants Chemical Co., Inc. 83
Metal & Thermit Corp. 110
Michigan Buff Company 109
Michigan Chrome & Chemical Co. 13
Minnesota Mining & Mfg. Co. 14
Mutual Chemical Division, Allied Chemical & Dye Corp. 25

Northwest Chem. Co. 15
Norton Co. (Abrasives Div.) 69

Oakite Products, Inc. 59

P&L Research & Development Corp. 98
Patent Button Co. 99
Photovolt Corp. 106
Promat Division, Poor & Co. 98
Pyrosil, Inc. 91

Richardson-Allen Corp. 57
Rosenthal 109

Sabin Metal Corp. 102
Schaffner Mfg. Co. 78-80
E. E. Seeley Co., Inc. 101
Sellers Engineering Co. 23
Sel-Rex Precious Metals, Inc. 114
Sethco Mfg. Co. 103
Seymour Mfg. Co. 24
Sparkler Mfg. Co. 90
Spraying Equipment Corp. 108
Stainless Steel Corp. of America 61
Frederic B. Stevens, Inc. 4
Storts Welding Co., Inc. 104
George A. Stutz Mfg. Co. 79
Sulphur Products Co., Inc. 98

Thermal American Fused Quartz Co. 105
Trerice, H. O., Co. 96
True Brite Chemical Products Co. 22

U. S. Stoneware 60
Udylite Corp. 66A, B
Unit Process Assemblies, Inc. 100
Univertical Foundry & Machine Co. 100

Vanton Pump & Equipment Co. 31

Wagner Brothers Inc. 86-87
Wallace & Tiernan 12
Wolverine Metal Co. 95
Worklon, Inc. 98

Zialite Corporation 111

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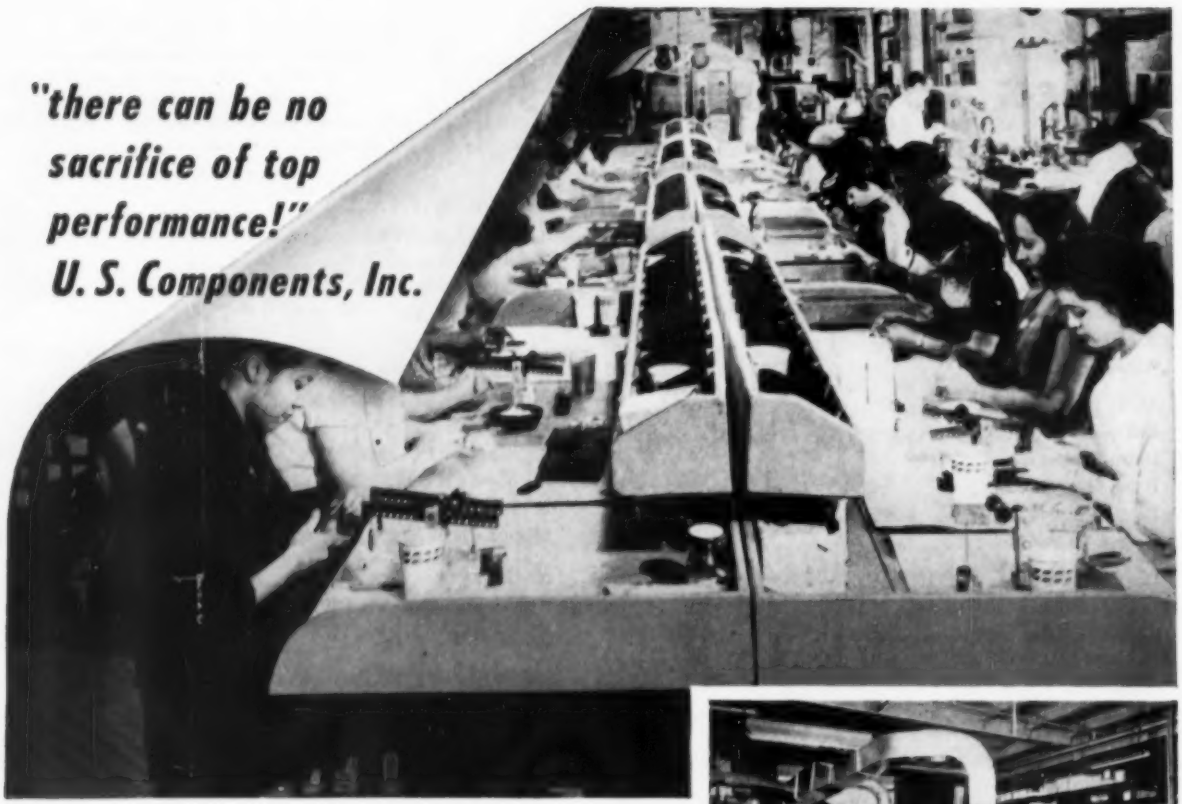

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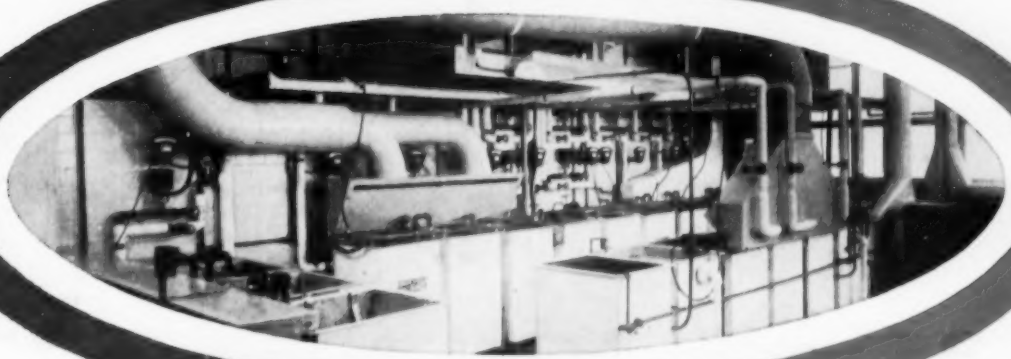

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